Token Lecture Series

January 15, 2019

Organized By

Blockchain NYC
http://blockchainNYC.io

Chainhaus
http://chainhaus.com

Token Lecture Series

Meetup Page: htttp://blockchainNYC.io

Upcoming Events

Jan 21 - 26 - Zero to Hero Python Bootcamp
Feb 28 - HyperLedger Fabric for Architects & Developers
Feb 4 - Artificial Intelligence Masterclass
Feb 11 - Data Science for Medical Professionals
Feb 12 - Full Day JVM Data
Feb 25 - Blockchain Masterclass
Feb 18 - Building Crypto App w/ Django + Python
Feb 26 - Global hBlockchain Healthcare

More Details: http://bit.ly/BlockchainNYCEvents

9:30 AM	What are enterprise tokens?	Jamiel Sheikh
10:00 AM	Tokenized Security Offerings & Crowdfunding	Samson Williams
10:40 AM	How to tokenize real estate	Alan Donenfeld
11:20 AM	Tokens & Securities: Regulatory Challenges Beyond the Howey Test.	Maureen Murat
12:00 PM	Tokenizing Equity	Michael Naylor
1:00 PM	How to move tokens across chains	Naiem Yeganeh
1:40 PM	Tokenizing Debt	Michael Mazier
2:20 PM	Security Tokens: Reinventing 50 years of financial services.	Grace Schroeder
3:00 PM	The Future of Stablecoins	Omid Malekan
3:40 PM	How to perform SWOT analysis on STOs	Eilon Shalev
4:20 PM	Digital Assets: the third blockchain revolution	Todd McDonald
5:00 PM	Using blockchain to automate VC terms in an STO Contract - a Cornell Tech Example	Joshua Jahani
6:00 PM	Challenges to stablecoins	Dan Raykhman
7:05 PM	Tokenizing science	Sean Manion

What are enterprise tokens?

Professor Jamiel Sheikh
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Bio

- CEO of Chainhaus (dev shop, education, STO advisory, products and studio)
- 20 years of enterprise and startup fintech experience
- Professor at Columbia, NYU and CUNY teach graduate level data science, blockchain, AI & performance management
- Writing O'Reilly book on Corda
- Organizer of Blockchain NYC
- Coder since 11 yo: Java, Kotlin, Python, Scala, C, C+, Solidity, NodeJS, Swift, Objective-C
- Education:
  - Second Master's in AI from Georgia Tech
  - MBA Columbia University
- LinkedIn: http://linkedin.com/in/jamiel

What is an enterprise?

- Organization
- 3 Ps
  - Privacy matters
  - People matter … (and are not anonymous)
  - Profits matter

What is a token? Philosophical

- Arbitrary label
- For arbitrary value
- A coin is a token
- A token is not a coin

What is a token? Economist / Trader

- Digital asset
- Varying valuation models
- Friction
- Fractional

What is a token? Technologist

- Rules (“smart contract”)
- Asset

Token Valuation

- Bitcoin - Unfettered standard deviation %ch
- Stablecoin - Fettered standard deviation %ch
- Everything in between
- Omid Malekan & Dan Raykhman

Public / Private Chains

- Blockchain diffusion
- Todd McDonald
- Naeim Yaganeh

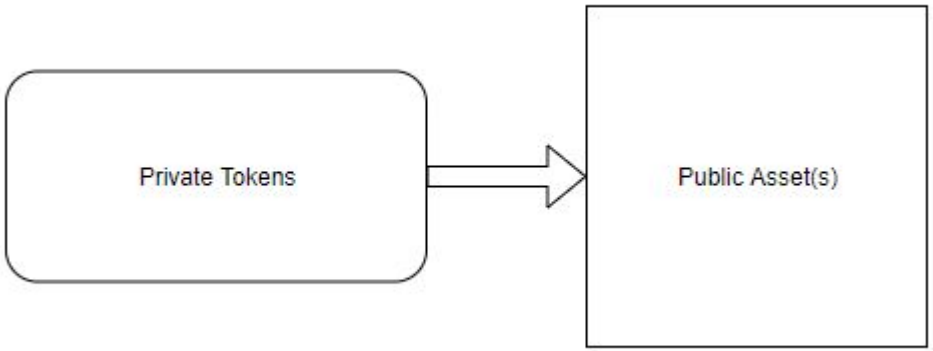
Private Market Valuation

- Public reference
- Beta, multiples, ratios
- Compcos, etc.

What is an enterprise token?

- Internal economy
- Awarded / Traded
- External liquidity
- Public market reference
- Public market redeemability

Enterprise token: Basic architecture



Underlying assets

- Cash
- Stablecoins
- Enterprise's STO (Samson Williams, Eilon Shalev, Maureen Murat, Joshua Jahani)
- Enterprise's debt (Michael Mazier)
- Real estate (Alan Donenfeld)
- Public equity (Mike Naylor)
- R&D IP (Sean Manion)
- Other cryptos
- Why?
    - Transparency
    - Cash in enterprise is not transparent
- Custodian (Grace Shroeder)

Challenges

- Cross chain
- Atomic transactions
- External redemption

Use Case: Performance Management

Use Case: Performance Management

- AI + IoT to track behavior
- Extreme fractionalization of $1
- Streaming “compensation”
- Enterprise wallets

Thank You

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Tokenized Security Offerings and Crowdfunding

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Bio

Principal, Axes And Eggs - A Think Tank & Digital Advisory

Adjunct Professor, University of New Hampshire School of Law - Blockchain, Cryptocurrency & Law

Instructor, London School of Business & Finance - Blockchain, Fintech & Cash Management Systems

Deputy Chief of Staff, Fannie Mae - Ops & Tech Executive Office, 2008 - 2016

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Things You're Getting Wrong about STOs:

1. Security Tokens exist
2. You're not crowdfunding
3. Lockup periods can be avoided
4. You can trade STOs today
5. Crowdfunding rules for securities don't already exist
6. You'll make more money selling your security as a "token"

DACS: Digital Assets, Commodities, Securities

Thank You

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Tokenizing Real Estate

Alan Donenfeld
CityVest
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Bio

Alan Donenfeld has 40 years of experience as a financial services entrepreneur. He founded several investment and financing companies as well as investing in and advising on over $3 billion of deals.

Founder and CEO of CityVest, an online investment marketplace for real estate private equity funds. Alan oversees all investment, technology and administration of the company.

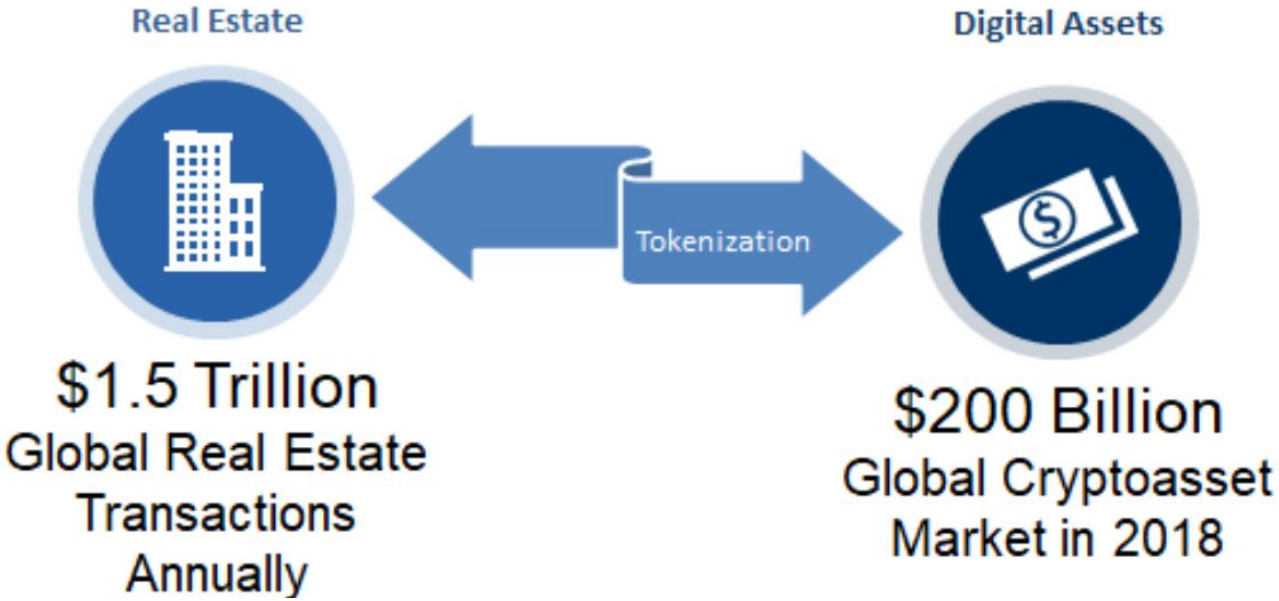
Founder and General Partner of Paragon Capital, a private investment fund focused on making structured debt and equity investments.

Founder and President of Bristol Investment Group, an SEC registered / FINRA broker-dealer.

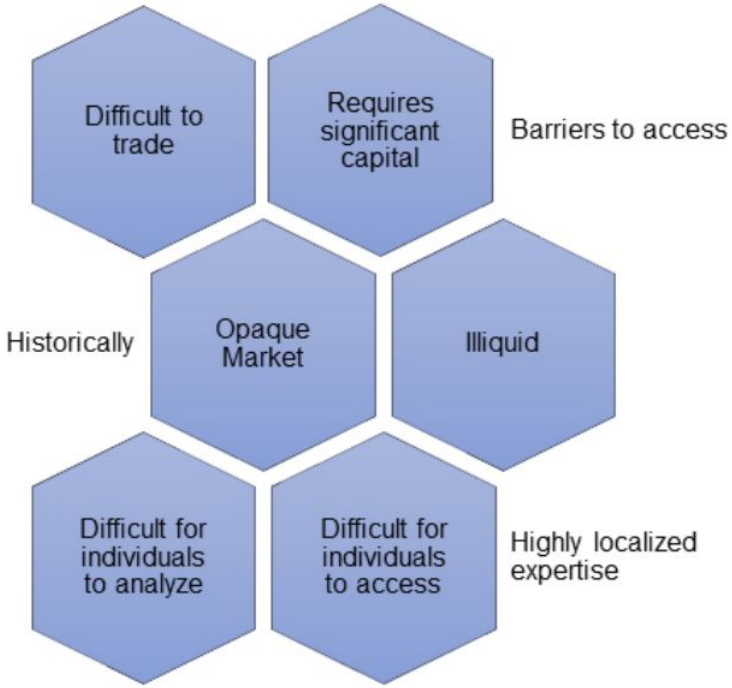
In the 1980's, for 10 years he worked in private equity for Bear Stearns and Lehman Brothers.

MBA from the Fuqua School of Business at Duke University and a BA from Tufts University.

The Opportunity: Massive Markets Meet



The Problem With Real Estate



The Solution: Tokenization

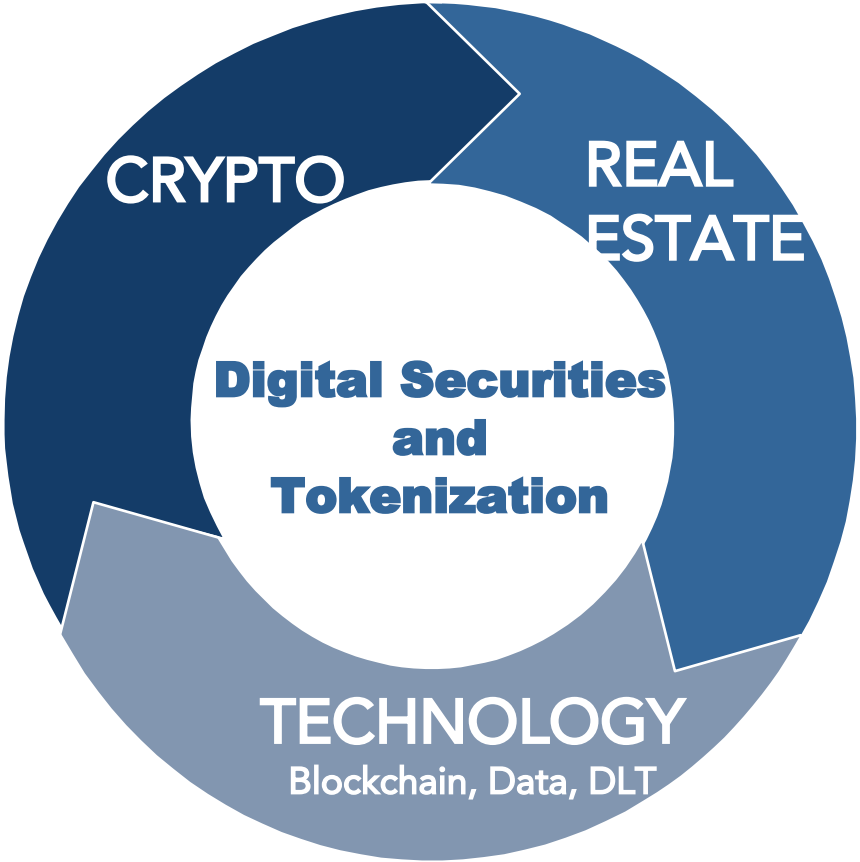
Tokenized Real Estate is a Backed by Assets

Tokenized Securities are Liquid & Tradeable

Transparency, Security & Fraud Protection

Combining Crypto, DLT and Real Estate

Tradability
Programmable
Securities



Asset
Backed
Liquidity

Access
Transparency

Efficiency
Reduced
Costs

Benefits of Tokenization and Digital Securities

COMPLIANCE	Built-in programmable regulatory compliance at the token and protocol levels
LIQUIDITY	Access to global markets 24/7/365
EFFICIENCY	Eliminate friction and middlemen, immediate trades/pricing and lower costs
FRACTIONAL OWNERSHIP	Lower barriers to entry creates more investors and more liquidity
PROGRAMMABLE SECURITIES	Self-executing governance and investor/issuer rights such as dividends, buybacks and cap table management
TRANSPARENT & IMMUTABLE	Providing more direct and certain ownership to investors

Strategic, Legal and Technical Considerations

1. Type of Interest is Being Tokenized

- **Direct ownership** in the equity or debt of an asset
- **A fund** holding one or more real estate assets
- **REITS** aka **T-REITS**

Strategic, Legal and Technical Considerations

2. Legal Domicile

- Physical location of the asset is crucial to the valuation and long-term viability of the asset.
- Property rights are strong in the US, and will vary by jurisdiction.
- SwissRealCoin (CH), Evareium (UAE), IHT (China), MonacoEstate, etc.

3. Corporate Structure and Governance

- How is the equity structured? Corporation, partnership, other.
- Who are the officers?
- How to handle: voting rights, liquidation of assets and distributions?

Strategic, Legal and Technical Considerations

4. Capital Raise through Issuance Platform or Issuer Direct

- Investor onboarding and management, KYC/AML, aftermarket support

5. Exchanges and Secondary Trading

- Which exchanges will be online, registered and capable of transacting with the token by the time minimum lock-up periods expire?
- How do they integrate with each other?

6. Token Custody

- Various institutional custody solutions are in early stages of commercial use. Which are the most trusted and reasonably priced?
- How will token holders conveniently maintain access?
- What happens if private keys are lost?

Strategic, Legal and Technical Considerations

7. Securities Regulation

- For U.S. sales, tokens will need to be registered as securities through the SEC with placement under Reg D, Reg S or Reg A+ offerings.
- International offerings must comply with local securities regulation. (FINMA, MAS, FSA)

8. Tax Implications

- Issuers must be aware of any tax and reporting requirements they may incur.

Strategic, Legal and Technical Considerations

10. Timing and Budget

- Issuers will need to ensure they are sufficiently capitalized to weather unexpected complications.
- The process can take anywhere from 3-9 months, with roadshow and investor relations consuming a major proportion.
- To what extent can broker dealers assist with this part and how will they be compensated?

ERC-20	The prevailing standard, most commonly used for ICOs.	Only allows for one issuance event.
ERC-721	Non-fungible Standard	Enables verifiably unique digital assets (for ex. Cryptokitties and other collectibles)
ERC-1440	Security Token Standard	Provides a suite of standard interfaces for issuing / redeeming tokens, managing ownership and transfer restrictions.
ERC-1410	Adds security specific metadata that renders token partially fungible	Allows programming different parameters for direct ownership of individual assets such as Real Estate

Tokenized Real Estate Deals So Far

1. Tokenized REIT: Aspen St. Regis Hotel

- Sponsor/owner was Elevated Returns
- Offered through Templum Markets
- The St. Regis Aspen Resort is a trophy property and a luxury tourist destination
- A token sale in the Fall of 2018 brought in $18 million for at a $100 million valuation of the equity.
- The cap rate is reported to be 5.8 percent
- This was security token offering using Reg D 506c (general solicitation)
- Tokens represent 18.9% indirect ownership of the corporation that owns the asset
- Tokens constitute common shares in REIT with voting rights (tokenized common equity)
- It is believed that a group of Chinese investors contributed most of the capital in the deal, rather than crypto investors buying the tokenized equity.

Deals So Far

2. Tokenized REIT: Student Housing Apartment in South Carolina

- Sponsor / Owner: Convexity Properties
- Offering through Harbor
- $20M of tokenized equity capital: T-REIT
- 49% equity ownership
- 955 shares – represented by 955 tokens
- Available at minimum investment of $21,000 each token
- The 14-floor, 500,000 square-foot facility includes 260 apartment units with over 800 beds, 4,000 square feet of street-level retail, 6,000 square feet of leased commercial space,150,000 square feet of parking and common space
- BitGo is the custodian of the asset

Deals So Far

3. Direct Ownership Interest: NYC Condo Development

- Issuance by Propellr and Fluidity's AirSwap
- $36.5 million appraisal, minimum investment is $25,000
- 12 Unit Condo in Manhattan
- Reg D 506c offering
- Investors will have the option of receiving either analog or digital securities
- Investors will be entitled to a preferred return and profit participation
- AirSwap technology will be utilized allowing for a compliant secondary market trading

Digital Securities – Growing Pains

Smart Contract and Token Technology

Technology to enable the issuance of digital securities.

Securitize	Polymath	Securrency
Civic	KoreConX	Prime Trust

Exchanges and Token Marketplaces

Exchanges and token marketplaces are in place to provide liquidity.

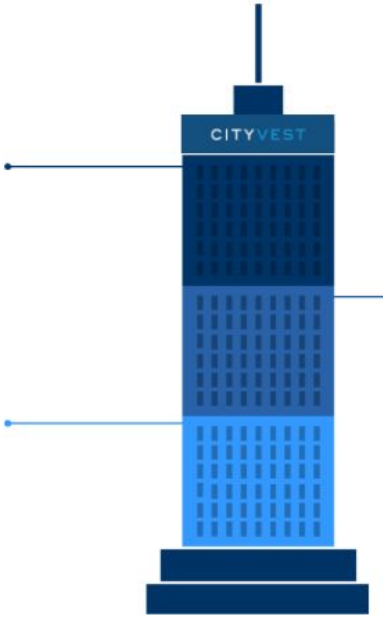
Liquidity will be a key differentiator for tokenized / digital securities.

Templum Markets	Harbor	Swarm	Neufund	tZERO
CoinBase	Bancor	Gibralter Stock Ex.	Malta Stock Ex.	Sharespost
Bnk To The Future	OpenFinance Network	AirSwap (Fluidity)	Cointopia	Entoro

The Future of Tokenization

LIQUIDITY and ACCESS
Marketplaces and
Secondary Trading Exchanges

EFFICIENCY AND REDUCED COSTS
Investor Onboarding and Token Issuance Technologies



COMPLIANCE AND PROGRAMMABLE SECURITIES
Security Regulations,
Governance and Transparency

Thank You

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Tokens & Securities: Regulatory Challenges Beyond the Howey Test

Maureen Murat
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5 Things SEC Wants You to Know About ICOs

ICOs can be securities offerings.

They may need to be registered.

Tokens sold in ICOs can be called many things.

ICOs may pose substantial risks.

Ask questions before investing.

Commodity Futures Trading Commission - CFTC

The definition of “commodity” in the Commodity Exchange Act (CEA) is broad:
— Physical commodity, such as an agricultural product (e.g., wheat, cotton) or natural resource (e.g., gold, oil).
— Currency or interest rate.

In 2015, Bitcoin and other similar virtual currencies were determined commodities by the CFTC. CFTC determined that because as defined, commodity includes: among other things, "all services, rights, and interests in which contracts for future delivery are presently or in the future dealt in," the CFTC’s jurisdiction is implicated when a virtual currency is used in a derivatives contract, or if there is fraud or manipulation involving a virtual currency traded in interstate commerce.

https://www.cftc.gov/sites/default/files/idc/groups/public/documents/file/labcftc_primercurrencies100417.pdf

Internal Revenue Services - IRS

@CrowdieAdvisors

Financial Crimes Enforcement Network - FinCEN

https://www.fincen.gov/resources/statutes-regulations/guidance/application-fincens-regulations-persons-administering

In 2013, FinCEN issued an interpretive guidance to clarify which regulations pursuant to the Bank Secrecy Act ("BSA") are applicable to persons/companies creating, obtaining, distributing, exchanging, accepting, or transmitting virtual currencies.

In it, virtual currency defined as a medium of exchange that operates like a currency in some environments, but does not have all the attributes of real currency.

Tokenizing the Equity of Private Companies

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Bio

Michael Naylor, Managing Director at Edgewater Markets, has over 30 years of experience in financial services sales and marketing, introducing innovative products and developing new markets. Mike helped launch the first electronic inter-bank fiat matching system at Dow Jones Telerate and lived and worked in Asia and Europe opening new markets as Chief Marketing Officer for Standard & Poor's. Mike holds a BA in Economics from Rutgers University and an MBA in Finance and Int'l Business from NYU Stern School of Business, with studies at The Hong Kong University of Science and Technology.

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Security Tokens – General Overview

- Tokenization was popularized by initial coin offerings (ICOs).
- Security Tokens involve issuing digital tokens on a distributed ledger that represent fractional ownership of an *underlying financial asset*.
- Traditional “securities” are financial instruments, such as stocks (equity) and bonds (debt), which can be tokenized.
- Other assets, not considered “securities” traditionally, including real assets, such as real estate and art, and commodities, such as gold and foreign exchange, can also be tokenized.

Private Placements

- Securities such as equity or debt sold directly to private investors, rather than as part of a public offering, are considered “private placements”.
- Many private companies raise equity capital prior to going public thru private placement of shares.
- Private placements are subject to regulations that limit the number and type of investors that can buy shares.
- When raising money, a private security issuer typically specifies the terms of the securities in a *Private Placement Memorandum* (providing details regarding the company’s business, use of proceeds, the price and timing of the transaction and shareholder rights among other information).
- In the past, privately owned securities have been illiquid as they have not had easily accessible secondary markets.

“Tokenizing” Assets

- *Tokenization of assets, whether traditional financial securities, real assets, commodities or private placements, has the promise of enabling any asset to be traded like a traditional security on digital exchanges.*
- Some of the advantages of tokenization include:

  - Lower cost issuance as compared to traditional capital markets
  - Automated compliance thru programmable “smart contracts”
  - Improved transparency and accuracy of ownership records
  - Efficient investor management, including streamlined payment of dividends, buy-backs, communications, etc.
  - Increased accessibility thru fractional ownership, global reach and 24/7/365 availability

Regulations

- Regulatory frameworks in the US such as Regulation D, Regulation S, Regulation A+, and Regulation Crowdfunding apply to the issuance and sale of securities.
- The regulations regarding selling securities are designed to protect investors with limitations on:
  - who can sell securities, for example US broker-dealer or FCA regulated brokers in the UK
  - who can invest in securities offerings, for example US accredited investor or EU sophisticated investor rules
  - who can run a marketplace, for example USA ATS license or EU MTF license
- *Many STO's are set up as private placements which are not open for the general public, to avoid the heavy regulation associated with publicly listed securities.*
- Reg D 506(c), which is limited to accredited investors, requires a 12-month lock-up when investors are not allowed to sell or transfer their shares, but afterwards the shares can be freely traded.

Tokenized Private Company Equity

- *Tokenized equity is simply issuing traditional private placement equity in the form of a digital security token.*
- Tokenizing a *private company's* equity provides advantages over traditional fund raising including:

  - Lower cost of issuance
  - Automated compliance via smart contract
  - Efficient shareholder management and transparency via blockchain
  - *Liquidity via listing on security token exchange*
  - Interoperability via blockchain standards (for example, ERC-20)
  - Borderless 24/7/365 access

Anatomy of an Equity STO

- Reg D 506(c) Private Placement, offering equity in a private company.
- Available to accredited investors only.
- Delaware (US) company registration.
- *Offering an opportunity to purchase a Simple Agreement for Future Equity (SAFE), which secures the right to acquire shares (equity) in a private company at a later date.*
- The SAFE is considered a prepaid forward contract for tax purposes.
- After the offering is complete the SAFE terminates and the investor holds uncertificated shares in the company in the form of tokens or book-shares.

Why SAFE

- Share price and company valuation agreed up front.
- *Issuers can close with an investor as soon as both parties are ready to sign and the investor is ready to wire money, instead of trying to coordinate a single close with all investors simultaneously*.
- Both founders and investors have more certainty and transparency into what each side is giving and getting
- Issuer receives funds sooner, has more time to establish shareholder management processes and issue the tokens properly.
- Investor lock-up begins when they execute the SAFE and provide investment funds.

Plan for Tokenizing

- Provide investors with option of receiving either analog or digital interests in the securities.
- Arrange for issuance of the token on Ethereum blockchain (ERC 20).
- Develop smart contract.
- Establish compliance, reporting and shareholder management functions.
- Identify security exchange(s) and market maker(s) for trading post lock-up period.
- Establish policies for maintaining the number of investors post-lockup period (non-accredited and total number of investors).

Timing of Equity Issuance

- After the offering is complete/terminated, within 90 days shares are issued, either in token form or uncertificated book-shares.
- “Certificate of Designation” filed with Corporate Register in Delaware, which contains the terms of the shares.
- Arrange for the transfer of the digital assets.
- After the lock-up shares are freely tradable on a “designated exchange” (determined by company management).

Thank You

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EDGEWATER
COIN

How to move tokens across chains

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Bio

As a computer scientist specializing in distributed database systems, Naiem is dedicated to solving the most complex and fundamental problems in the blockchain and cryptocurrency sector. Naiem obtained his PhD in Computer Science from University of Queensland in Australia, and has been developing massively scalable distributed systems as an engineer and machine-learning expert throughout the last decade, most notably at Microsoft, Amazon, and Bloomberg. Taking these skills and experiences, he built Ferrum Network, a entirely new kind of decentralized interoperability network, from the ground up. Naiem is no stranger to entrepreneurship. He sold his first software package before high school, and he founded and ran a computer game company from 2001-2005, selling thousands of units.

The decentralized trust

- The #1 innovation of bitcoin was to decentralize trust.
- For the first time in history human has access to a technology that eliminates need to trust
- What are the notable business models of trust?
  - Governments
  - Banking system
  - Crediting system
  - Education certificates, bachelor, master, PhD, etc.
  - Corporations
- First / easiest application of decentralized trust:
  - Tokens that can represent some sort of value

ERC-20 vs chuck e cheese tokens

- Issuing tokens representing values is not new
- Preventing counterfeit has never been easy
- Legal hurdles, need of trust, lack of market for tokens prevented emergence of a token economy

ERC-20 as a standard to facilitate token economy

- Trust is provided by ethereum blockchain.
- Very hard to counterfeit
- Standard interface means tokens can be easily traded using popular tools
- Global reach and lack of central agency meant regulators cannot just shut down the economy

Token standards

Standardization provides means for systems to be implemented once yet interact with all tokens

- ERC-20, ERC-223, ERC-721, And ERC-777
- Each standard defines an API (Application Programming Interface)
- API allows standard interaction with the token program:
    - Create or burn tokens
    - Move ownership
    - Get balance
    - etc.

Example: ERC-20

```
// ----------------------------------------------------------------------------
// ERC Token Standard #20 Interface
// https://github.com/ethereum/EIPs/blob/master/EIPS/eip-20.md
// ----------------------------------------------------------------------------
contract ERC20Interface {
    function totalSupply() public view returns (uint);
    function balanceOf(address tokenOwner) public view returns (uint balance);
    function allowance(address tokenOwner, address spender) public view returns (uint
remaining);
    function transfer(address to, uint tokens) public returns (bool success);
...
}
```

The great wall between networks

- Token standards are limited to one network
  - E.g. Ethereum Network
- Different networks cannot interact
- A token in the Ethereum network cannot be moved to the Bitcoin network

Could there be standard for networks such as standards for tokens?

- In theory, yes. In reality much harder
- Most important networks already exist and cannot be easily changed
- Communities of networks don’t have a lot of motivation to join a standard
- It might / will happen in future
- Unlike token standards, existing interconnectivity standards are not loved

Flashback - Why so many networks?

- Bitcoin was a great means of transaction, but was limited otherwise
- Ethereum envisioned a universal unstoppable computer that can run any program
- Other networks (e.g. Zcash) wanted to make transactions impossible to track

Major problem of all networks

- They all failed at scaling
- Bitcoin transactions became expensive and slow with more people using Bitcoin
- Many others tried to solve the scaling problem, hence TPS (Transactions Per Second)

What is Proof of Work?

- Blockchains are open so everyone can create their own version of reality and present it to others.
  - The reality here means which transaction happened before another.
  - The famous double spend problem
- To ensure there is only one version of reality the proof of work was invented
  - Transactions get confirmed by people who solve pointless math problems
  - The math problem is designed such that there is no shortcut to solve it other than hard work. Being smart, rich, or famous doesn't help either
  - But it is very easy to verify the solution. For example, finding a needle in haystack. Once you found it it is easy to verify you did. Just show us the needle
  - As the time goes on more and more problems are solved and results accumulate
  - For a bad actor to create an alternative version of reality, they should work infinitely hard, so it doesn't make sense.

What is Proof of Stake?

- Proof of work is very expensive
- A lot of electricity is used to solve those math problems
- Bad for environment
- Doesn’t scale

Alternative, Proof of Stake

- Its like American democracy.
- If you are in the system and hold the currency, your vote counts
- If you hold a lot of currency, your vote counts more than others
- Reasonable compromise to PoW as long as stake is fairly distributed
- But less secure

Proofs of ...?

- Delegated proof of stake
- Proof of time and space
- Proof of useful work
- Proof of reputation
- Proof of capacity
- Proof of elapsed time
-

Many networks with different protocols

Moving tokens across networks

Necessary for adoption

- If we move Bitcoin to a fast and cheap network, we can use it as currency
- If we move XRP to a network with smart contracts we can use it in a decentralized application
- If we have access to other tokens in the network we use for payment, we can pay using those currencies
- If we move tokens across networks, we can exchange values freely

Middle man - the traditional way

- A middle man holds tokens from both words
- User interacts with the middle man
- Middle provides the service user wants for an exchange of fee
- Middle man man must be trusted
- Middle man can go bankrupt, steal the value, get hacked, be subject to regulation
- This is how world has worked so far

Examples:

- Coinbase
- VISA
- Hedge funds

Removing the middle man - no trust necessary

- In a decentralized trustless world there is no room for middle men
- Users can interact peer to peer
- An auditable, unchangeable program can be the middle man
- Middle man can become decentralized itself. No single entity ever has custody
- There could be a middle man but no trust needed due to mathematical magic

Off chain transactions - Lightning network

- A cryptographically secure method to move transactions off-chain
- This means people can do transactions peer-to-peer or middle man without blockchain
- No need to trust anyone.
- Protocol ensures that in worst case scenario no-one's assets can be stolen
- Blockchain as the back-off mechanism
- + No blockchain needed for transactions, hence very scalable
- + Trustless
- - Transactions not happening on blockchain
- - Long term locks required on assets
- - Complicated and not applicable to all networks

Atomic Swap

- Swap two assets without third-party risk
- + No trust
- - Slow and expensive

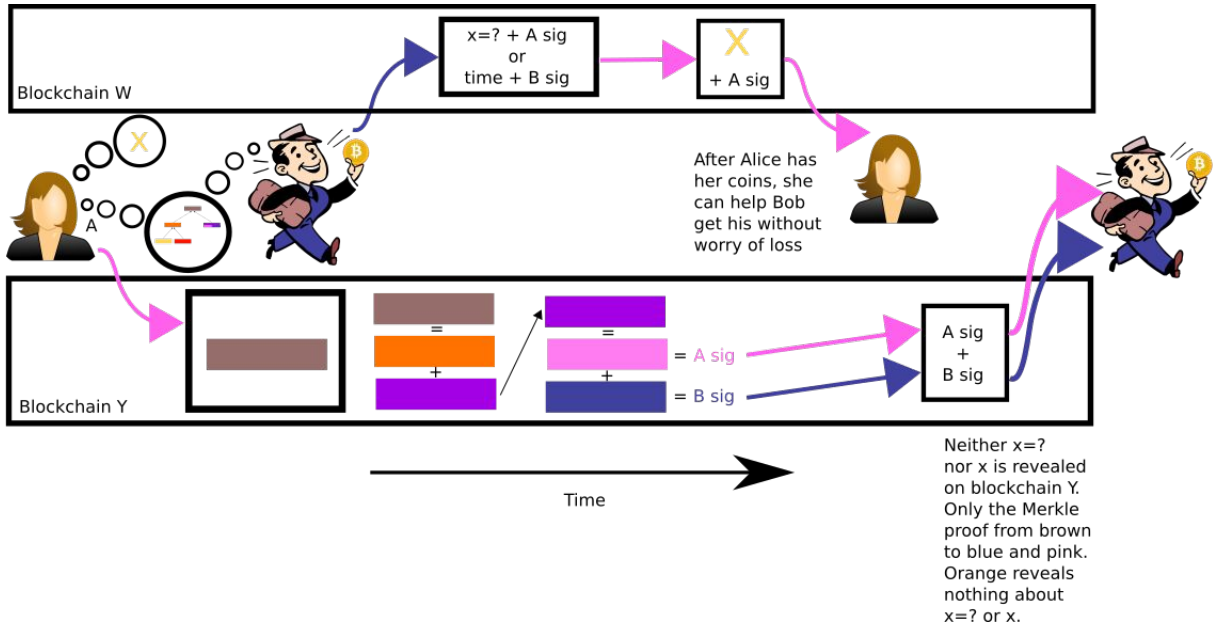

Image from hackernoon.com

Proxy Tokens

- Token in one network represents tokens in another
- Money vs Travel Check
- Hard to make it trustless
- + Can be very fast
- + Proxy tokens can be created in bulk, hence minimizing the exposure to original assets
- - Very hard to do trustless
- - Most current solutions are centralized or semi-centralized

Decentralized Proxy Tokens

- In development
- Check https://ferrum.network
- We can make the proxy tokens work without a need to trust a third party
- + Can be very fast and cheap
- + No need for smart contract, hence can cover almost all networks
- - No production solution available yet

World with isolated networks - before picture

- Hundreds of currencies do not interact
- Users need to use countless apps and tools
- Users need to be very sophisticated to navigate through all the tech
- Massive centralized exchanges (Coinbase, Binance, etc.) rule the crypto world
- Applications are limited by networks they can use
- Users need to choose which cryptocurrency they want to work with.

World with connected networks - After picture

- Hundreds of currencies can interact
- No need for centralized exchanges
- Assets can be changed freely without third parties
- Applications can use multiple networks
- Businesses can accept their favorite cryptocurrencies and be paid in any
- Adoption of cryptocurrencies for day-to-day use cases becomes more likely.

Thank You

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Linkedin: https://www.linkedin.com/in/naiem-yeganeh-12874712/

Peer-to-peer bond trading and tokenizing debt

Michael F. Mazier
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Bio

Michael F. Mazier, Founder & Chief Architect, Bondirectly

- Blockchain/ICO/STO advisor for Lampix, Opiria, dxDigital and others
- Co-Founder, LendingCalc analytics platform
- Chief quantitative strategist & portfolio manager of $5bn in assets at Van Eck Global
- Bond analyst/IT at Morgan Stanley, Merrill Lynch, Citibank
- Electrical engineer/artificial intelligence researcher at General Electric Aerospace
- MBA Columbia, MSEE Villanova, BSEE Syracuse

What is Bondirectly?

For institutional investors who pay huge markups trading odd-lot bonds, we're building a cryptographic peer-to-peer trading network so they can pay near zero markups while preserving privacy.

Problem

Small bond investors and large investors with odd lots pay more than 10X in brokerage costs compared with stock investors


THE WALL STREET JOURNAL.

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CREDIT MARKETS

Muni Bond Costs Hit Investors in Wallet

Investors Pay Twice as Much for Municipal Debt as for Corporate Bonds

Big Money

Mom-and-pop investors traded about $915 billion in municipal bonds from 2009–13. But they are paying more to brokers for those investments than do purchasers of other types of U.S. securities.

Average broker profit on $1,000 trade in 2013*

$20
15
10
5
0
Municipal bonds
Corporate bonds
Stocks

Percentage of securities held by individual investors

50%
40
30
20
10
0
Municipal bonds
Corporate bonds
Stocks

*For bond trades of $100,000 or less and stock trades of all sizes.

S&P Dow Jones Indices (bonds profit); Credit Suisse (stocks profit); Federal Reserve (securities)

The Wall Street Journal


THE EXPERTS

The Hidden—and Outrageously High—Fees Investors Pay for Bonds

Jan 13, 2016 8:30 am ET

MICAH HAUPTMAN: If you are a re

sells corporate or municipal bonds, d

paying to transact in those securities


TREASURYS

Regulators Want Data on Bond-Trade Fees

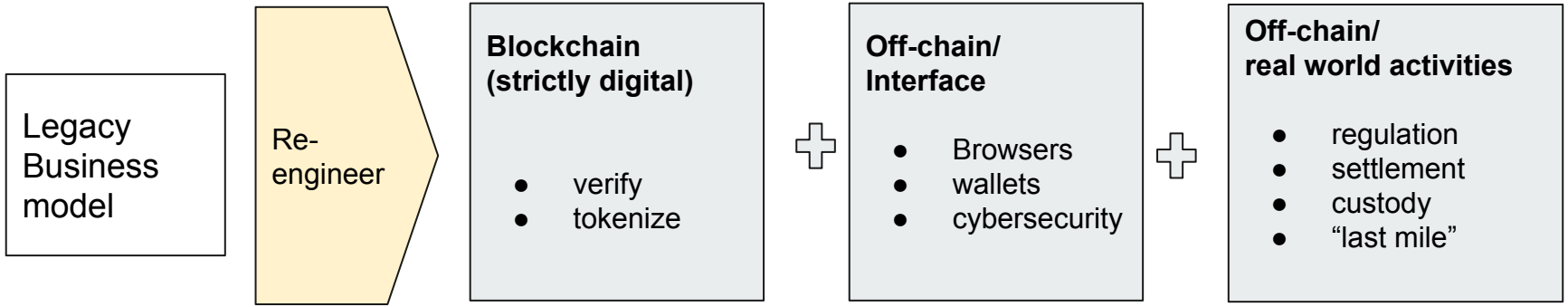
SEC, Others Scrutinize Markups Paid by Retail Bond Investors

By Katy Burne and Aaron Kuriloff

Jan. 13, 2015 6:55 p.m. ET

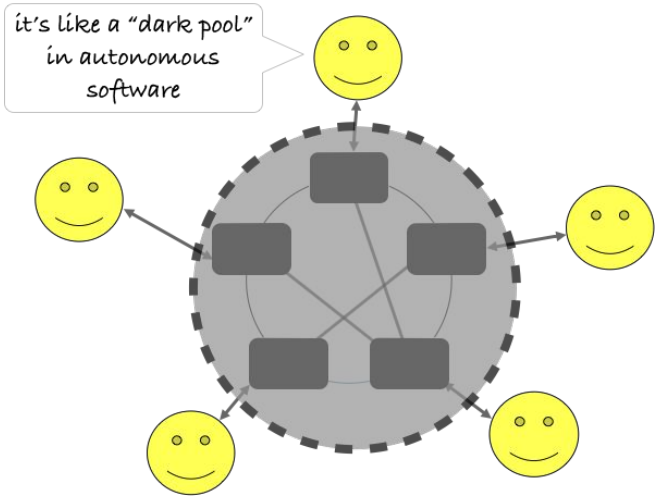
Source: Wall Street Journal, https://www.wsj.com/articles/muni-bond-costs-hit-investors-in-wallet-1394494093
https://blogs.wsj.com/experts/2016/01/13/the-hidden-and-outrageously-high-fees-investors-pay-for-bonds/

Discovery process

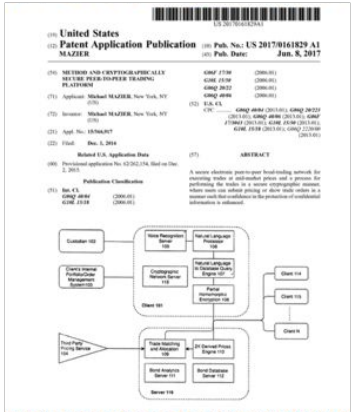


Solution

secure peer-to-peer trading network using cryptography/encryption for investors to trade at mid-market prices while preserving privacy



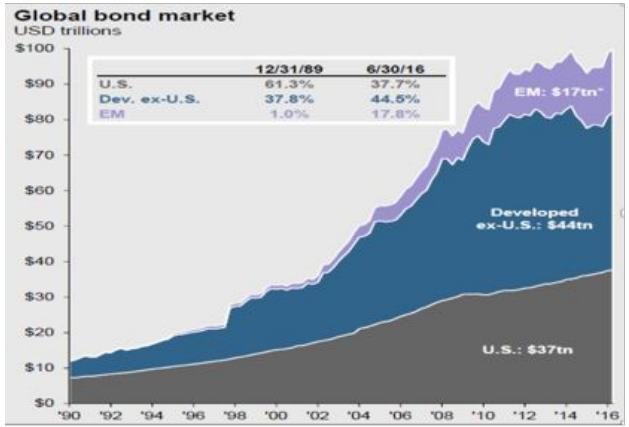
"Method and cryptographically secure peer-to-peer trading platform", patent pending with priority date: 12/2/2015



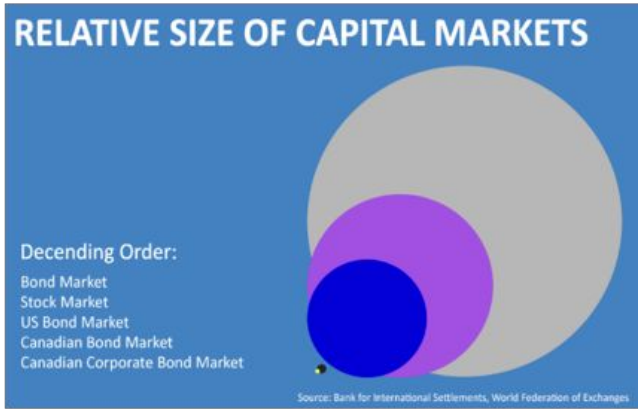
https://patents.google.com/patent/US20170161829A1

Market Size

Preliminary Data: Global bond market size is $100 trillion



Source: JPMorgan as cited in zerohedge.com



Source: Bank for International Settlements and World Federation of Exchanges as cited by Financial Pipeline (www.finpipe.com)

Total Addressable Market

US retail bond investors pay a conservatively estimated $33 billion per year in markup fees (corporate and municipal bonds only). Institutional odd-lots are additional

	2017 Trading volume ($billion)	% held by retail	retail markup	Total fees ($billion)
Municipal	2,700	45%	1.60%	19
USTreasury	126,300			
Agency MBS	52,275			
non-Agency MBS	625			
ABS	350			
Corporates	7,675	20%	0.90%	13.9
Federal Agency Securities	1,025			
Emerging Markets	4,901			
Total	196,851			33.2

Source: SIFMA (non-EM), EMTA for EM, Wall St Journal for markup estimates:
https://www.wsj.com/articles/muni-bond-costs-hit-investors-in-wallet-1394494093

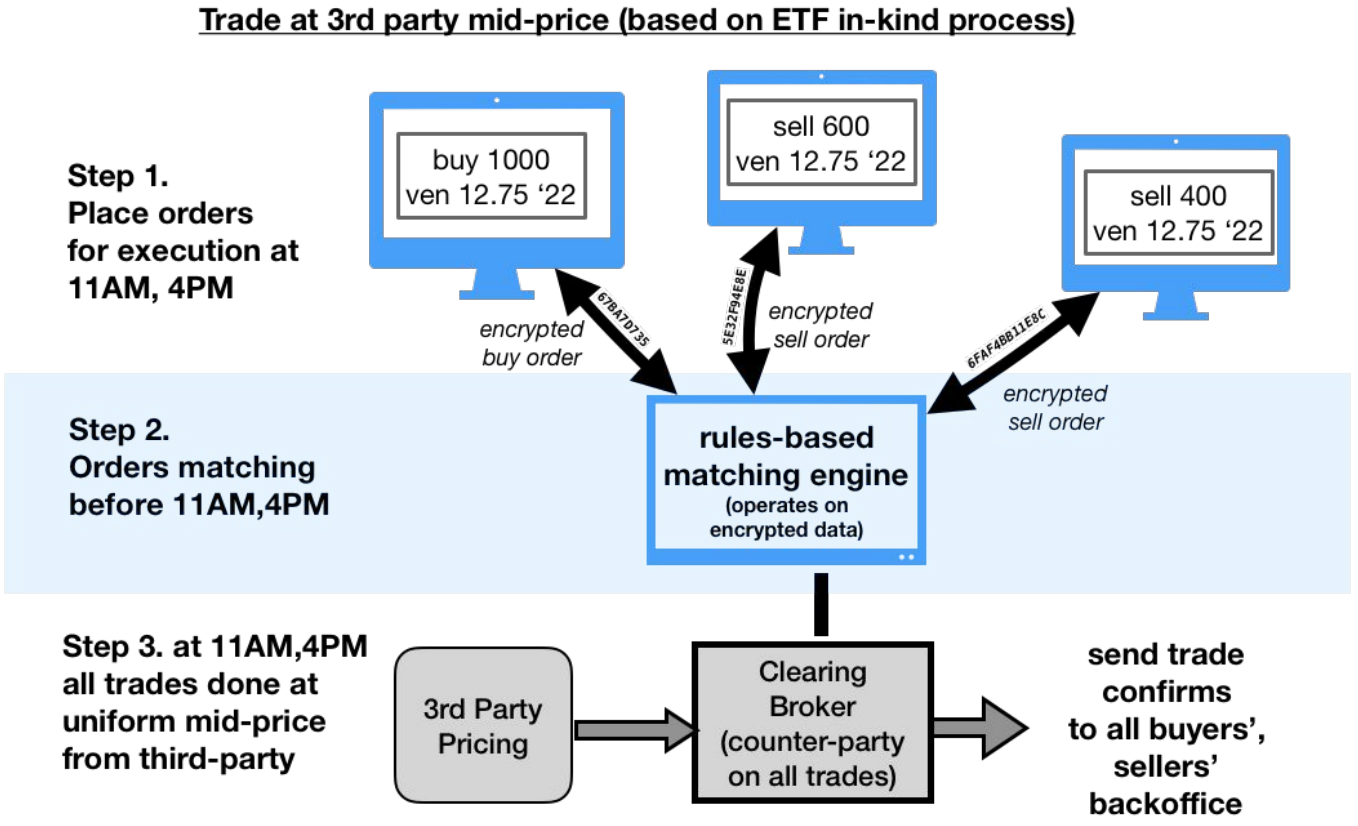
Why Now?

- Markup disclosure rule effective May 14, 2018
- MiFID II in Europe increases transparency, data
- Voluntary Fiduciary Rule “best interest” adoption
- electronic trading is gaining ground among institutional investors, but not for small trades. 80% of trading volume is still over phone/chat
- blockchain-related solutions are cautiously gaining mindshare in the regulated investment world

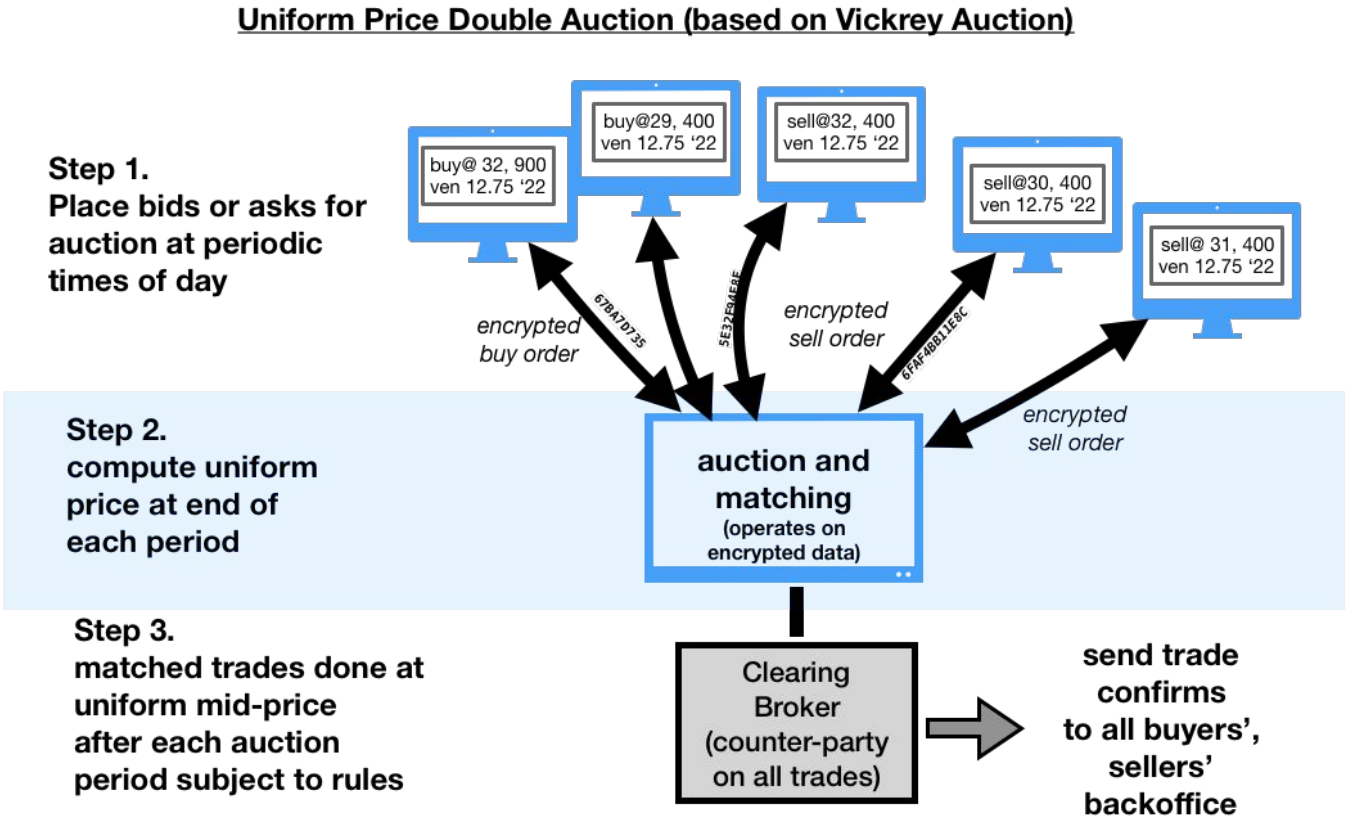
Competitive Landscape

	embonds.com	tmc	Tradeweb	MarketAxess (MKTX)	trumid	FIC Network	bondirectly
notes	emerging markets focus, $8.3m funding	privately held focus on munis	Thomson Reuters subsidiary; $430bn daily volume globally	$7.5bn market cap	funded $84mn by Soros, Thiel et al; focus on high yield	tokenizing bonds on blockchain (ICO raise targeting $16m)	startup w patent-pending re:p2p trading
founded	2013	2001	1998	2000	2016	2017	2018
annual revenue		est. $10-25m	not disclosed	$397 mil	n/a	n/a	n/a
peer-to-peer	no	no	no	no (some all-to-all)	yes	yes	yes
encryption to preserve privacy	no	no	no	no	no	no	yes
software-as-a-service	no	no	no	no	no	no	yes

Product


Trade at 3rd party mid-price (based on ETF in-kind process)
Step 1.
Place orders
for execution at
11AM, 4PM
buy 1000
ven 12.75 '22
sell 600
ven 12.75 '22
sell 400
ven 12.75 '22
encrypted
buy order
encrypted
sell order
encrypted
sell order
Step 2.
Orders matching
before 11AM,4PM
rules-based
matching engine
(operates on
encrypted data)
Step 3. at 11AM,4PM
all trades done at
uniform mid-price
from third-party
3rd Party
Pricing
Clearing
Broker
(counter-party
on all trades)
send trade
confirms
to all buyers',
sellers'
backoffice

Product


Uniform Price Double Auction (based on Vickrey Auction)
Step 1.
Place bids or asks for auction at periodic times of day
buy@ 32, 900
ven 12.75 '22
buy@29, 400
ven 12.75 '22
sell@32, 400
ven 12.75 '22
sell@30, 400
ven 12.75 '22
sell@ 31, 400
ven 12.75 '22
encrypted buy order
encrypted sell order
encrypted sell order
Step 2.
compute uniform price at end of each period
auction and matching
(operates on encrypted data)
Step 3.
matched trades done at uniform mid-price after each auction period subject to rules
Clearing Broker
(counter-party on all trades)
send trade confirms to all buyers', sellers' backoffice

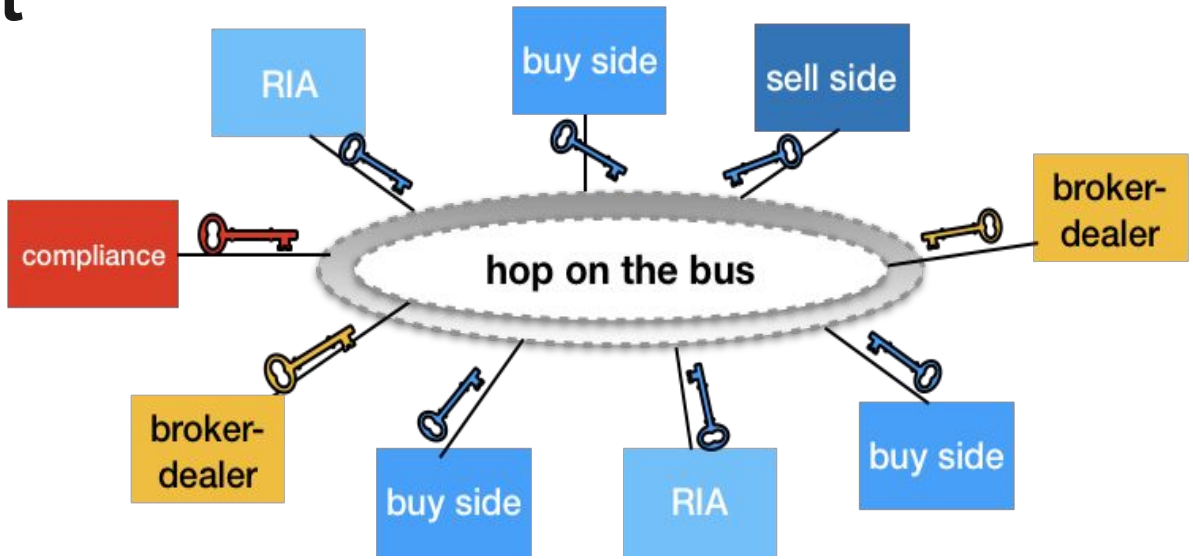
Business Model

Software-as-a-service model

Broker-dealer partners are counter-party for risk-less trade

User trades at mid-price + lowest transaction costs available from clearing broker-dealer

Initially test/focus on one market (Credit Risk Transfer Bonds)



Thank You

Michael F. Mazier

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646 825-0296

Security Tokens: Reinventing 50 years of financial services.

Grace F. Schroeder
OKTO
www.okto.io
grace@okto.io

Bio

Grace founded OKTO in 2010 and raised $3.5M in Angel financing including a sizable investment from Britt Banks, Chair of the World Economic Forum for Sustainable Mining.

Prior to OKTO, Grace was the Senior Director of Channel and Field Marketing at Qwest Communications where she negotiated the first North American carrier agreement to integrate Microsoft's fledgling Hosted Messaging & Collaboration (now LYNC) platform with Voice over IP delivered by Qwest.

From 2000-2002, Grace launched two managed hosting startups in Chicago IL that featured an EMC data-centric architecture that later informed the design of the OKTO platform. From 1998-2000, Grace founded GO Trading in Los Angeles, CA which she grew from 1 to 5 branches and $3M in annualized revenue.

From 1995-1998, as Vice President of Variable Annuities, she helped design and launch the Transamerica/Dreyfus Triple Advantage Variable Annuity which she grew from launch to $400M in the first 12 months, and then launched the successful Charles Schwab Variable Annuity. Prior to Transamerica, Grace managed a retail client base for Shearson Lehman Hutton, and was responsible for the Northern California territory for John Nuveen & Company where she helped launched the first closed-end bond fund, raising $1.2B in 1987.

Grace has a BA in Psychology from San Francisco State University and has attended executive education programs at the Center for Creative Leadership in La Jolla, CA,, Harvard University and Northwestern/Kellogg.

THE RAPID MIGRATION TO DIGITAL SECURITIES REQUIRES REINVENTING 50 YEARS OF FINANCIAL SERVICES SYSTEMS IN FIVE

Stocks/Bonds/Real Estate

Nasdaq

NYSE

OTC

Security Tokens

tZERO

SHARESPOST

RIALTO

TEMPLUM

coinbase

SECURRENCY

HARBOR

SECURITIZE

FundAmerica

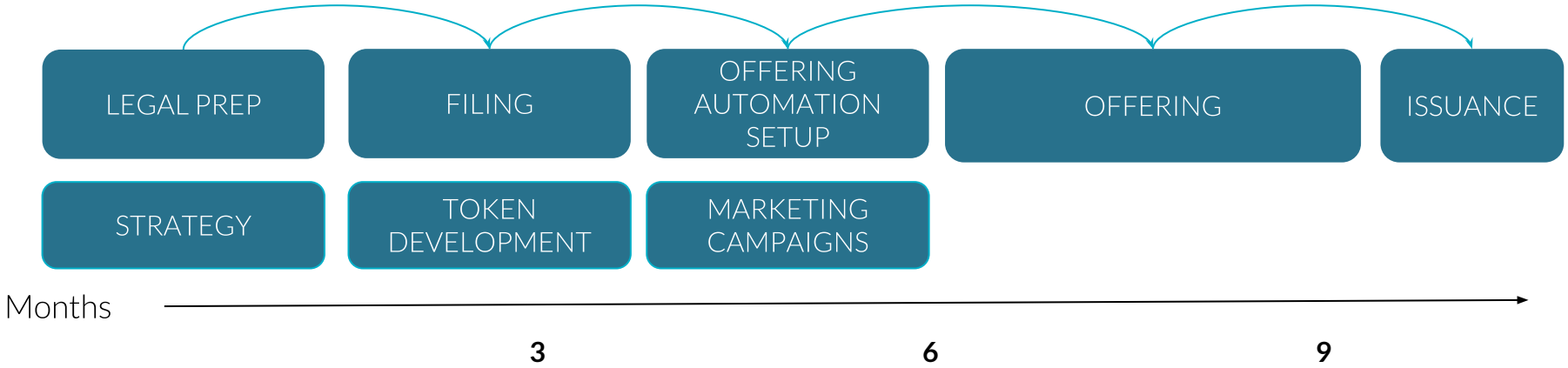
seedinvest

NORTHCAPITAL

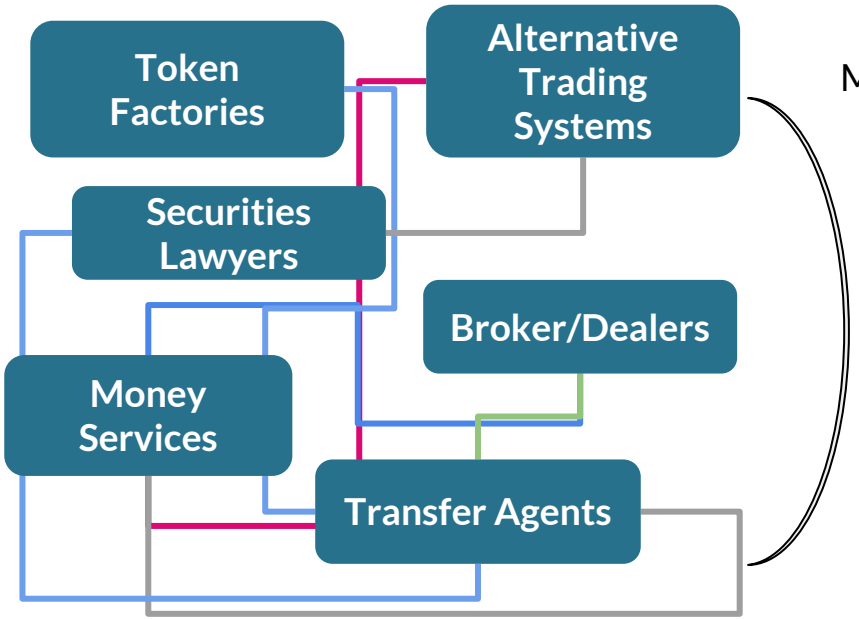
Vtoken

Computershare

LAUNCHING A SECURITY TOKEN REQUIRES THE TIGHTLY COUPLED EFFORTS OF ISSUERS, LAWYERS, BROKER/DEALERS, MARKETING AND MONEY SERVICES

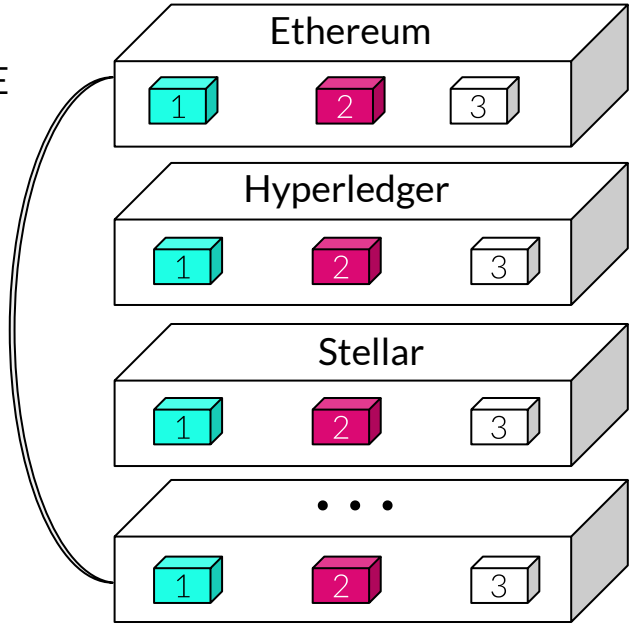


BLOCKCHAINS AND TOKEN PROTOCOLS REDEFINE TRADITIONAL ROLES AND SYSTEMS REQUIREMENTS

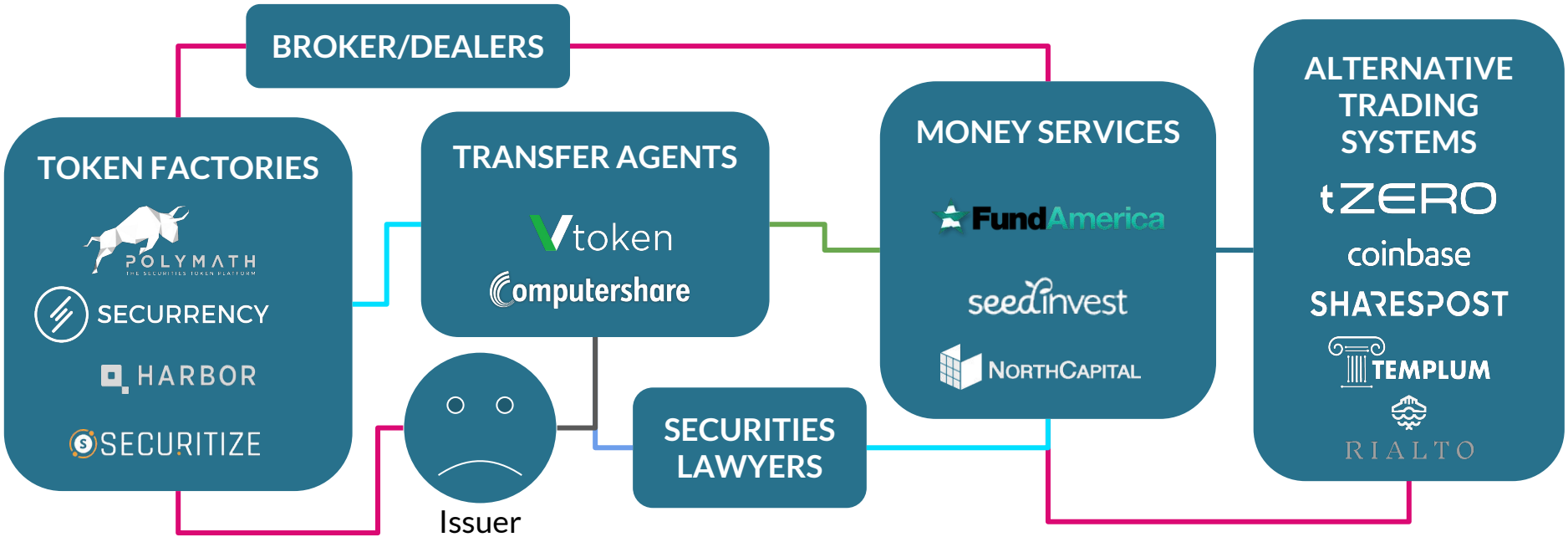


DISTINCT TECHNICAL METHODS TO OPERATE

Blockchains
Smart Contracts
Features
Modules
Whitelists
Wallets
Balances
Transfers
Reporting



EVERYONE IS NAVIGATING NEW TECHNOLOGY IN THE FACE OF PERSISTENT CHANGE



THE UNIVERSE OF SECURITY TOKEN PROTOCOLS AND WHITELISTS INFRASTRUCTURE IS EVOLVING IN AN EFFORT TO AUTOMATE SEC COMPLIANCE

SECURITY TOKEN PROTOCOLS

Security tokens are smart contracts represented by code that is deployed on a blockchain to manage the features of a security.

A growing number of service providers offer security token templates, automated token deployment, and whitelists that simplify the process of launching a security token.

WHITE LISTS

Whitelists govern the universe of investor wallets who are allowed to invest and trade security tokens. Each security token "consults" a whitelist before allowing a transfer of tokens to a given wallet address. The whitelist contains wallet addresses that are associated with investors who have passed relevant accreditation and/or KYC/AML screening requirements.

Example Protocols

POLYMATH
THE SECURITIES TOKEN PLATFORM

SECURRENCY

HARBOR

SECURITIZE

OKTO

WHILE SMART CONTRACTS CAN TECHNICALLY HANDLE THE DETAILS OF COMPLIANCE, THE SEC STILL FAVORS THE INVOLVEMENT OF REGULATED INTERMEDIARIES

Factories addresses

These are the current contract addresses of the factories on Ropsten:

```
SecurityTokenFactory                => 0x90A72deBA74d04bdC11c66429bcDeDa9C787De70
RestrictSenderTokenModuleFactory    => 0x83d07312CE1d15832791574b8208056731e9bFB0
KycTokenModuleFactory               => 0xA1F2CDeD2FEef1C7Fe4E51064A7fDE47fCE06747
InvestorsLimitTokenModuleFactory    => 0xBaFc429eC807E211e3B6811213f01f8cFE979a04
SupplyLimitTokenModuleFactory       => 0x1C7a97a80d083ddb6d41BC271Fc7356096d065E9
ForcedTransferTokenModuleFactory    => 0xF0C652bfAfA7D682f84451E29278B377699c59e3
OfferingTokenModuleFactory          => 0x6A96bd1C23cF6230FBF4547e0333923437C2716d
WhitelistFactory                    => 0xEB69F4703EeFEf5e640c076447F6fd723CFeb97f
StandardWhitelistFactory            => 0xf27597371C54628403eb665946CE3616800F5D14
MultiSigWalletFactory               => 0x6eedb6f85012c57a2789860ad27eee8be7821d8e
```

Libraries:

```
AddressArrayLib  => 0x3C904f91aBBc45195f33Db5336c0C20Ba6cBe242
Bytes32ArrayLib  => 0x44736Ba37e0304B8075E0f825e027991AbC73f4E
```

[Free OKTO Protocol (GitHub)]

BUDGETARY ESTIMATES FOR A SECURITIES TOKEN

REG A REGISTRATION	$125K-$350K
TOKEN DEVELOPMENT	$10K - $50K
TRANSFER AGENT	$10K SETUP + $5K/MONTH
OFFERING AUTOMATION	$50K SETUP + 3% OPTIONS + FEES
BROKER/DEALER	1%-8% DEPENDING UPON SERVICES
MARKETING	VARIABLE

Thank You

Grace F Schroeder

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Fiat Stablecoins: The Oldest New Idea in the World

Omid Malekan
Citi Ventures & Conversance
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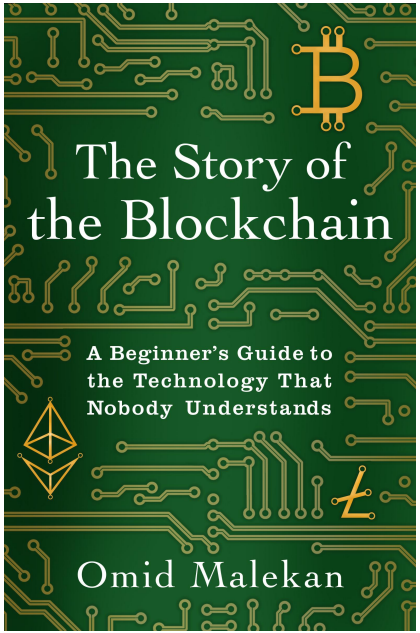
Bio

Author: “The Story of the Blockchain: A Beginner’s Guide to the Technology That Nobody Understands”

Blockchain Innovation Expert @ Citi Ventures

Explainer-in-Chief @ Conversance

www.explainer-in-chief.com



Fiat Stablecoins

“First killer application on blockchain”

“Worst blockchain idea ever”

“Stablewha??.....worst banking idea ever”

Definition

Fiat Stablecoin: A fully collateralized, transferrable and programmable digital token that could be redeemed for fiat money.

The New


tether
TrueUSD
GEMINI
dollar
PAXOS
STANDARD
Stably
USD Coin

Criticism

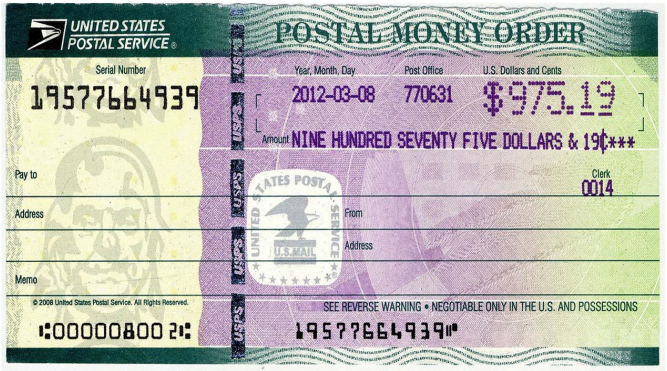
“..it is not obvious that the model will scale, or that governments will let it.”

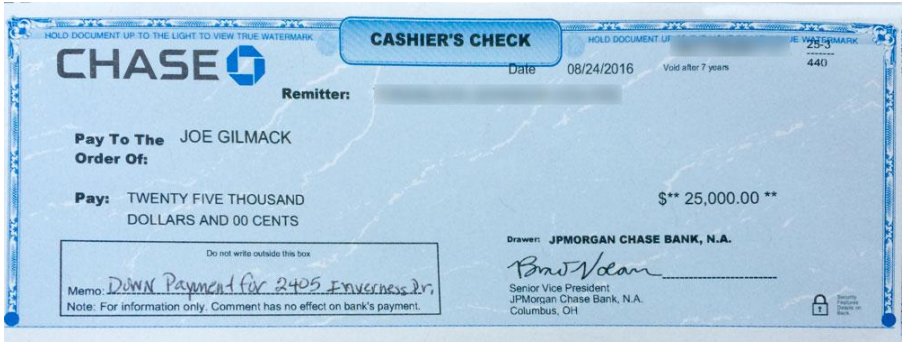
- Barry Eichengreen, Professor of economics at Berkeley

“Fiat stablecoins are too centralized, too censorable, and promote evil fiat money that this tech was invented to replace in the first place”

- Generic hardcore crpto guy

The Old


UNITED STATES POSTAL SERVICE
POSTAL MONEY ORDER
Serial Number
19577664939
Year, Month, Day
2012-03-08
Post Office
770631
U.S. Dollars and Cents
$975.19
Amount NINE HUNDRED SEVENTY FIVE DOLLARS & 19¢***
Pay to
Clerk
0014
Address
From
Address
Memo
© 2008 United States Postal Service. All Rights Reserved.
SEE REVERSE WARNING • NEGOTIABLE ONLY IN THE U.S. AND POSSESSIONS
:00000800 2:
19577664939


HOLD DOCUMENT UP TO THE LIGHT TO VIEW TRUE WATERMARK
CASHIER'S CHECK
CHASE
Remitter:
Date 08/24/2016
Void after 7 years
440
Pay To The Order Of: JOE GILMACK
Pay: TWENTY FIVE THOUSAND DOLLARS AND 00 CENTS
$** 25,000.00 **
Drawer: JPMORGAN CHASE BANK, N.A.
Do not write outside this box
Memo: Down Payment for 2405 Inverness Dr.
Note: For information only. Comment has no effect on bank's payment.
Senior Vice President
JPMorgan Chase Bank, N.A.
Columbus, OH


NETSPEND
4000 1234 5678 9010
GOOD THRU 12/20
YOUR NAME HERE
DEBIT
VISA

Definition

Traditional Payments: A fully collateralized, transferrable and programmable *thingie* that could be redeemed for fiat money.

The Current

Wires <> SWIFT <> ACH <> ABA <> FedWire

How We Pay

Fact: Most payments are not done in physical cash, but with cash proxies held at institutions.

Fact: In 2017, global payments industry revenues hit $2T (McKinsey)

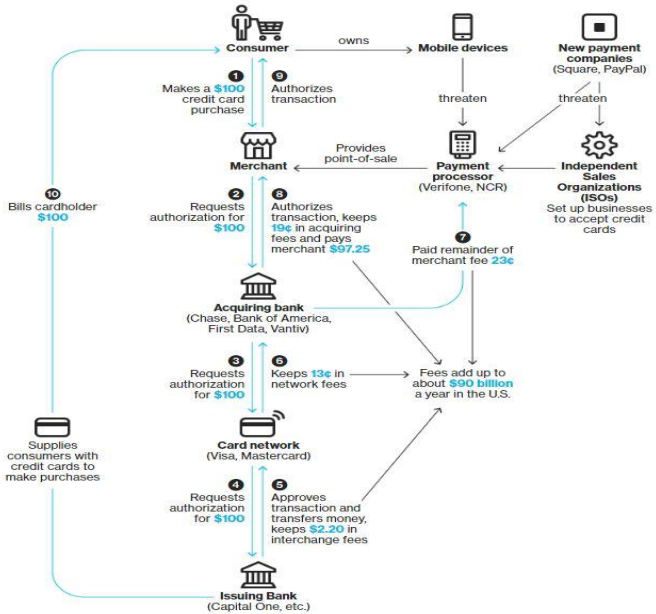
Fiat Stablecoin

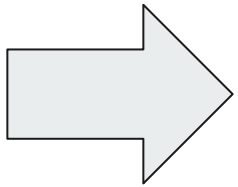
The least controversial idea in all crypto, applying new technology to a very old idea.

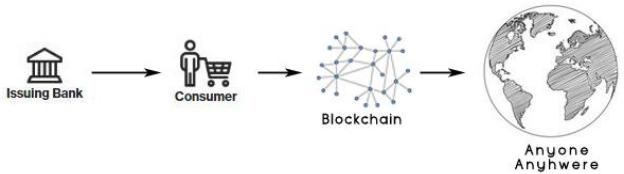
But Why?

- First Truly Global Payment System
- Speed
- Cost
- Accessibility
- Simplicity

Old Payment System vs. New







Speed

Type of Payment	Settlement Time
Paper Check	5 days
ACH	2 days
Wire	1 day
Fiat Stablecoin	Minutes - Seconds
E-pay (PayPal, Venmo, etc)	Instant

Cost

Method	Fee ($1 million)
PayPal (merchant)	$29,000
Transferwise	$600
Fiat Stablecoin	A few cents

In the Crosshairs

Company	Market Cap
Visa	$300b
PayPal	$100b
Adyen	$23b
Transferwise	$2b

The Beneficiaries

- Gas Stations
- Retailers
- Low Margin / High Frequency Commerce
- Micropayments
- Small Business
- You!
- The Crypto Industry

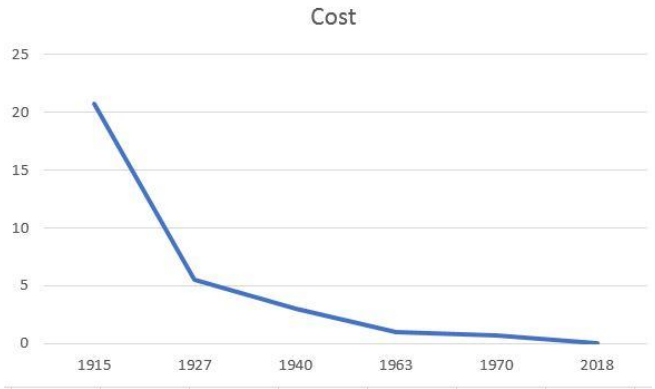
The Endgame

Thanks to Fiat Stablecoins, we are now on the fast track to a world where payments are free.

All payments.

From anyone anywhere to anyone else anywhere else.

How is that possible?



“They say it couldn’t be done” 1977 TV ad for 70 cents per minute

“Long distance is still the most profitable business in America, next to importing illegal cocaine.”

- CEO of Qwest Communications, 1997
  (while introducing 7 cents per minute)

Conclusion

A payment is nothing more than data, and data wants to be free, both physically and financially. Fiat stablecoins, and the decentralized, global and public blockchain rails they employ, will help realize that dream.

P.S.

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Thank You

Omid Malekan

omid.malekan@gmail.com

Preliminary SWOT analysis for STOs

Eilon Shalev
elphi, Inc.
elphi.io
eilon@elphi.io

Bio

12.5 years in multiple commanding-officer positions in the Israeli Air Forces

PM @ heastart.co.il | The Leading Israeli Crowdfunding Platform

MBA @ MIT Sloan

Founder @ elphi, Inc.

What is a security?

Investment Contract

The HOWEY test

1. An investment of money or assets
2. In a common enterprise
3. With an expectation of profits
4. Predominantly from the efforts of others

ICOs - securities?

How do we record a $15mm ICO in the company books:

	A	=	L	+	E
	$15mm (Cash)	=	?	+	?

What is Money?

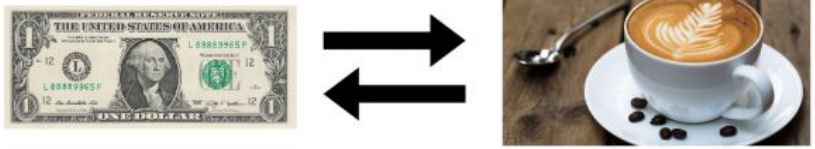
A Social Agreement of

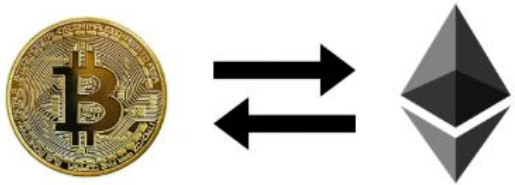
1. *Medium of exchange*
2. *Store of value*
3. *Unit of account*

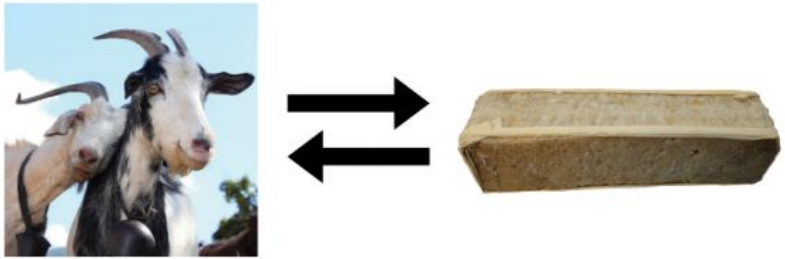
Cryptocurrencies - are they really currencies?

Medium of Exchange

Anything that is used to determine value during the exchange of goods and services

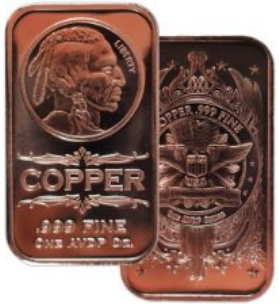






Store of Value

Something that keeps its value if it stored rather than used



Unit of Account

Something that can be used to value goods and services, record debts, and make calculations

How many BTC / Satoshis for?

STO

Financial securities that mimic traditional shares

Security Tokens give investors some rights to the company

Traditional process of an IPO

So, why do we need STOs?

Strengths

1. The value of the company is commensurate with the value of the token

Weaknesses

1. Register just like an IPO - expensive (4-7% + $4mm)
2. Report like a public company - less flexible
3. A white paper is not enough - blockchain companies are not ready yet
4. Business logic behind STOs is unclear

Opportunities

1. Easy to raise money? - Investor FOMO
2. Establish brand in a blue ocean

Threats

1. Comply with SEC regulations - risk
2. Affected by how the market perceives STOs

Thank You

Feel free to reach out for any inquiry

eilon@elphi.io

Digital Assets & Security Tokens: Three blockchain revolutions... for the price of one?

Todd McDonald
R3
R3.com & corda.net
todd@r3.com

Bio: Todd McDonald

In my previous life, I was an FX Trader
(~15 years at Standard Chartered Bank)

In 2014/15, I helped co-found R3. I have held a lot of roles in that time: Head of Product, Head of Partners, Head of Digital Assets…

R3 is an enterprise blockchain company that has built the open source blockchain called **Corda,** which has an ecosystem of over 300 firms, across financial institutions, insurance companies, technology giants, systems integrators, ISVs and fintechs, to name a few

Revolution 3:
a new, more peer-to-peer capital market?

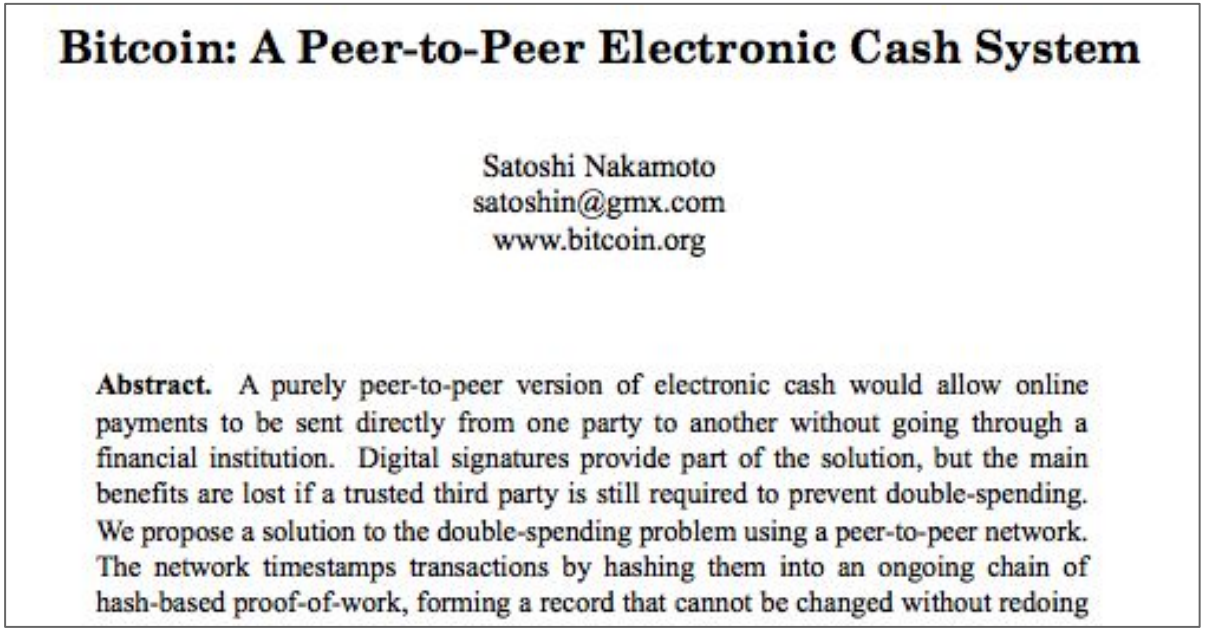
RICHARD GENDAL BROWN

Thoughts on the future of finance

POSTED BY GENDAL | POSTED ON JULY 23, 2015 | POSTED UNDER BITCOIN, BLOCKCHAIN, LEDGERS, MODELS | COMMENTS 42 COMMENTS

BITCOIN AND BLOCKCHAIN: ~~TWO~~ REVOLUTIONS FOR THE PRICE OF ONE?

Back to Revolution 1

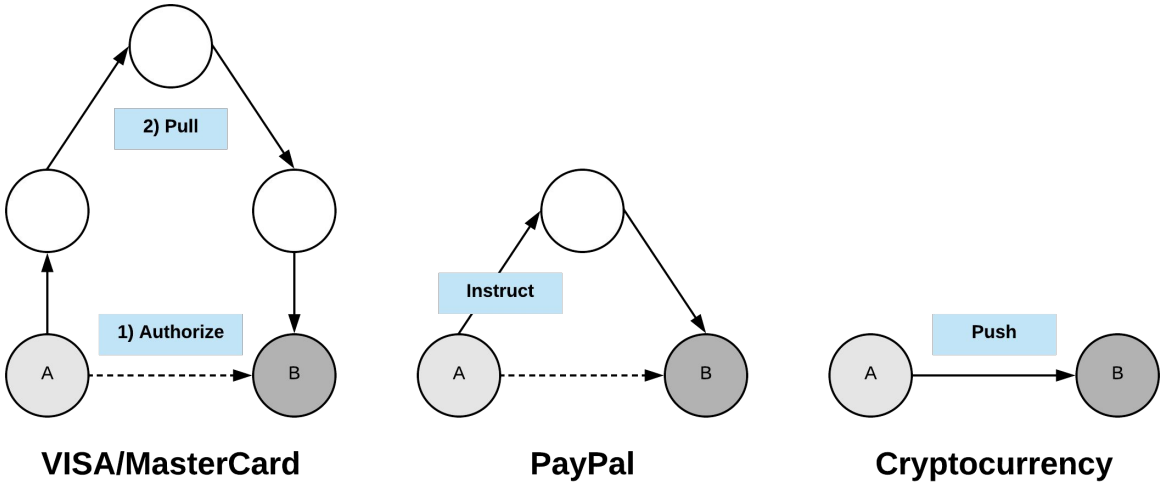


Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing

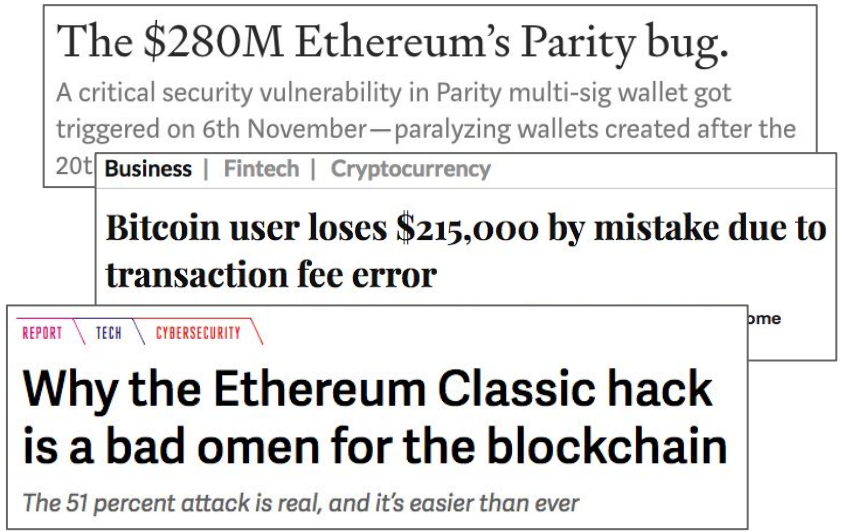
The ‘a ha’ moment…
the creation of censorship resistant digital cash



But…the original blockchain design just doesn't work for business

- It solves a different problem!
- Views lack of identity as a feature, not a bug
- No privacy: all data is shared with all participants
- Settlement is probabilistic, not definitive
- Existing smart contracts are buggy, difficult, prone to bad outcomes, and don't scale…

Turns out, being your own bank is kind of a drag!



Revolution 2

$215,000,000,000

The estimated IT spend by investment banks in 2017
...and it is probably on the low side!

Driven from hidden **costs**, intractable **complexity**
and countless points of **reconciliation**

What if...we could build an industry-level system of record?

What if...we could build an industry-level system of record?

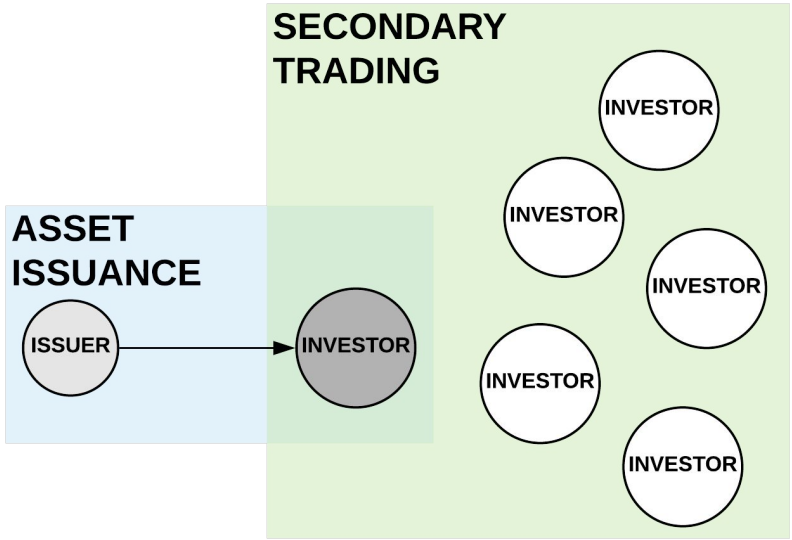
Back to Revolution 3

Lessons from the token gold rush

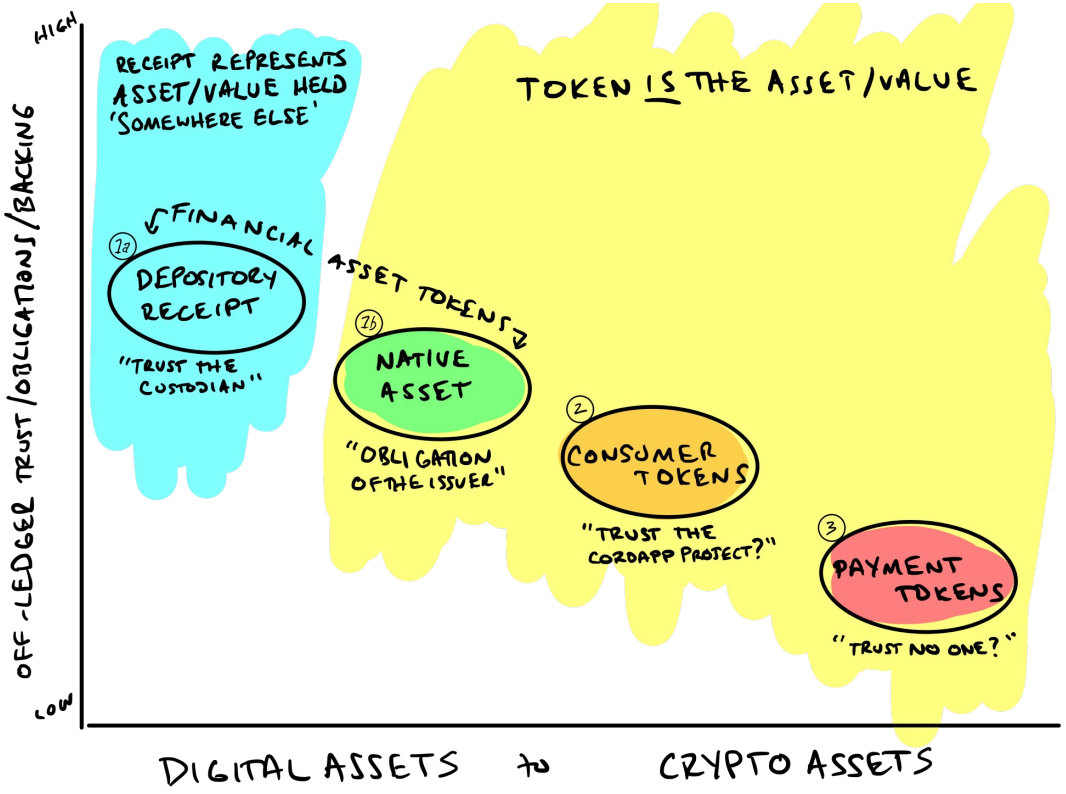
The ICO boom was a massive experiment with **other people's money**...

but also a new example of **peer to peer capital markets**

those **seeking capital** directly connecting with those looking to **allocate capital**

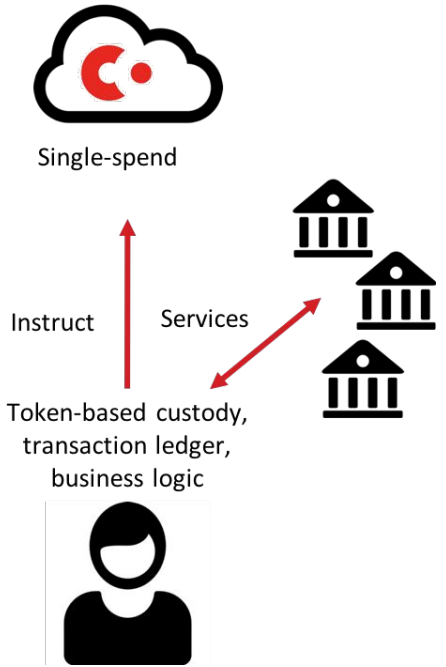


Tokens for the enterprise?



Why digital assets and tokens?

- New tools for capital formation
- Settlement (atomic DvP)
- Improved liquidity and access
- Banking while the bank is shut...



We need to remember where blockchains are best

- Need for many participants to reach consensus on a set of shared facts
- Need for many participants to share control over the evolution of shared facts
- Need for atomic value transfer
- **Need to create digitally scarce assets** (securities, money, identity…)

Thank You!

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Using blockchain to automate VC terms in an STO Contract - a Cornell Tech Case Study

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Cornell and NYU Teacher

NYU

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Investment Banker that Does STOs

FINRA

U.S. SECURITIES AND EXCHANGE COMMISSION • MCMXXXIV •

JAHANI & Associates

BBMA

Content

Increase trust in the ICO and STO market by addressing SEC rules, digital marketing practices, and investment banking objectives

The talent behind the project

Cyrus Ghazanfar
CS

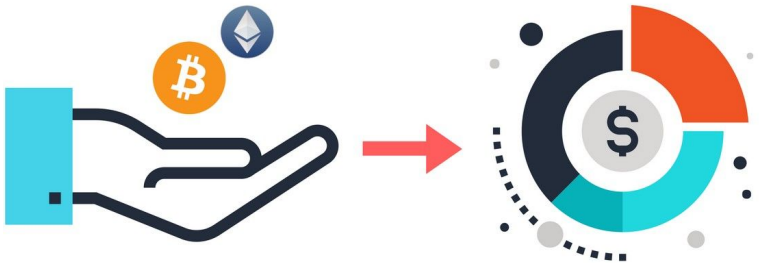
Pooja Kale
CS

Jim Campbell
MBA

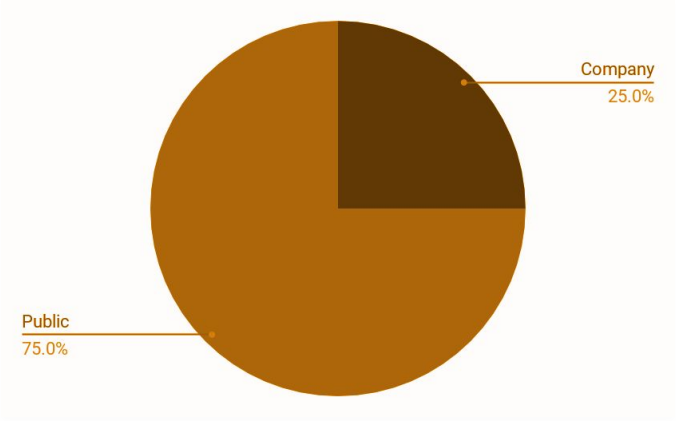
Kibum Byun
LLM

What is an ICO or STO?

A company creates a cryptocurrency (“coin” or “token”) and sells a portion to the public in order to raise money

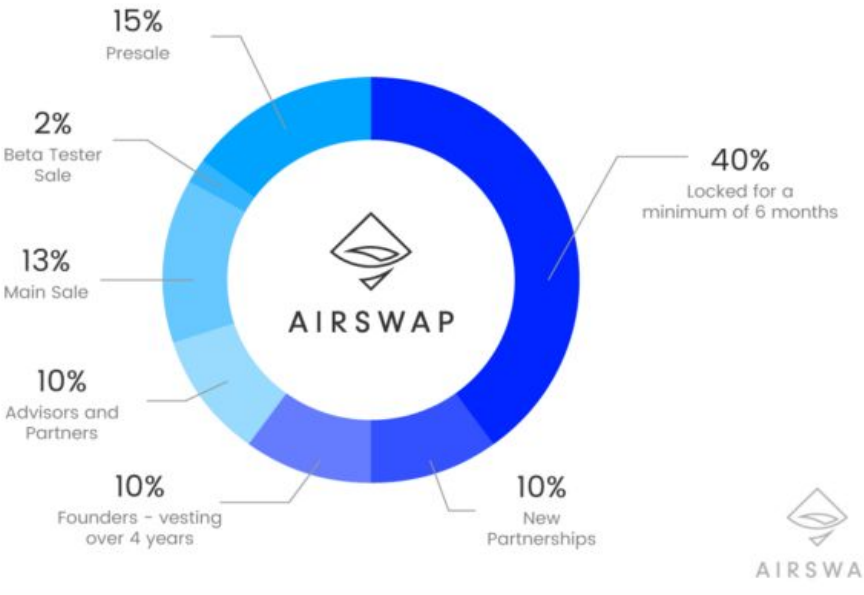


The company retains a significant portion of the tokens to be given to founders, employees, advisors, and more. **Investors have no transparency into how these tokens are actually distributed.**

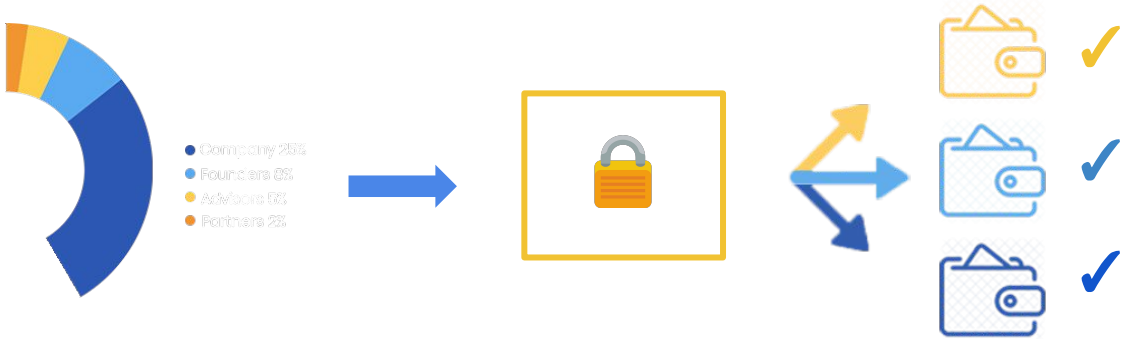


Example: Airswap

$37 million raised

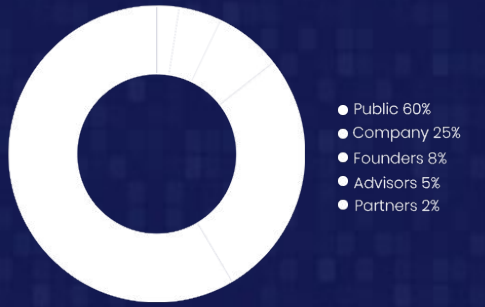


VestVault allows companies to create their own smart contracts that autonomously controls the token distribution in a secure and transparent way



vestvault

How It Works



Distribution from Whitepaper

Input Parameters

Smart Contract Generated

Upload Smart Contract

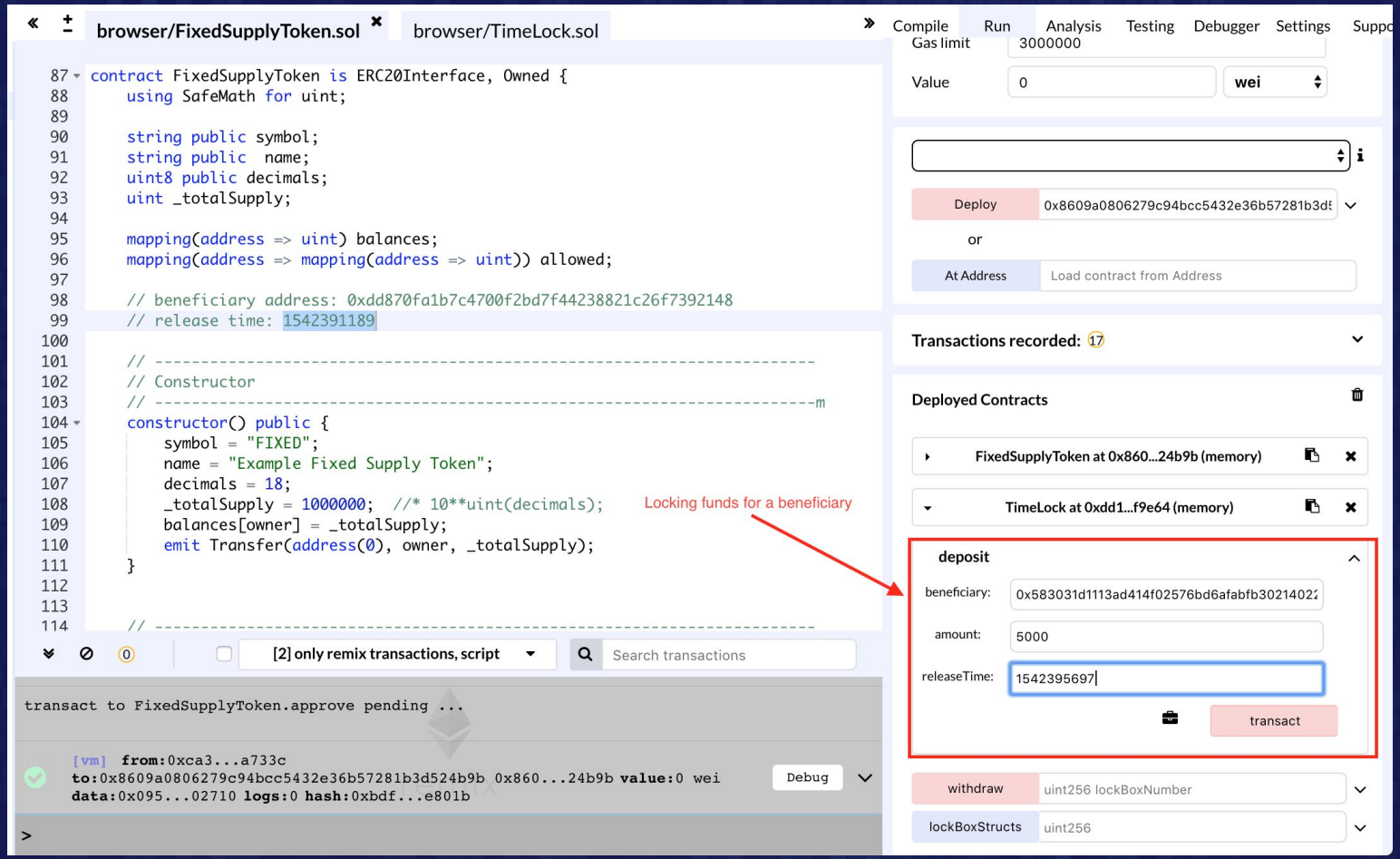
Distribution Locked in Blockchain

Tokens Vest Automatically


vestvault
Demo
1 Company Information
2 Add Stakeholders
Company Name
Airswap
Token Name
AST
Token Supply
100,000,000
Address

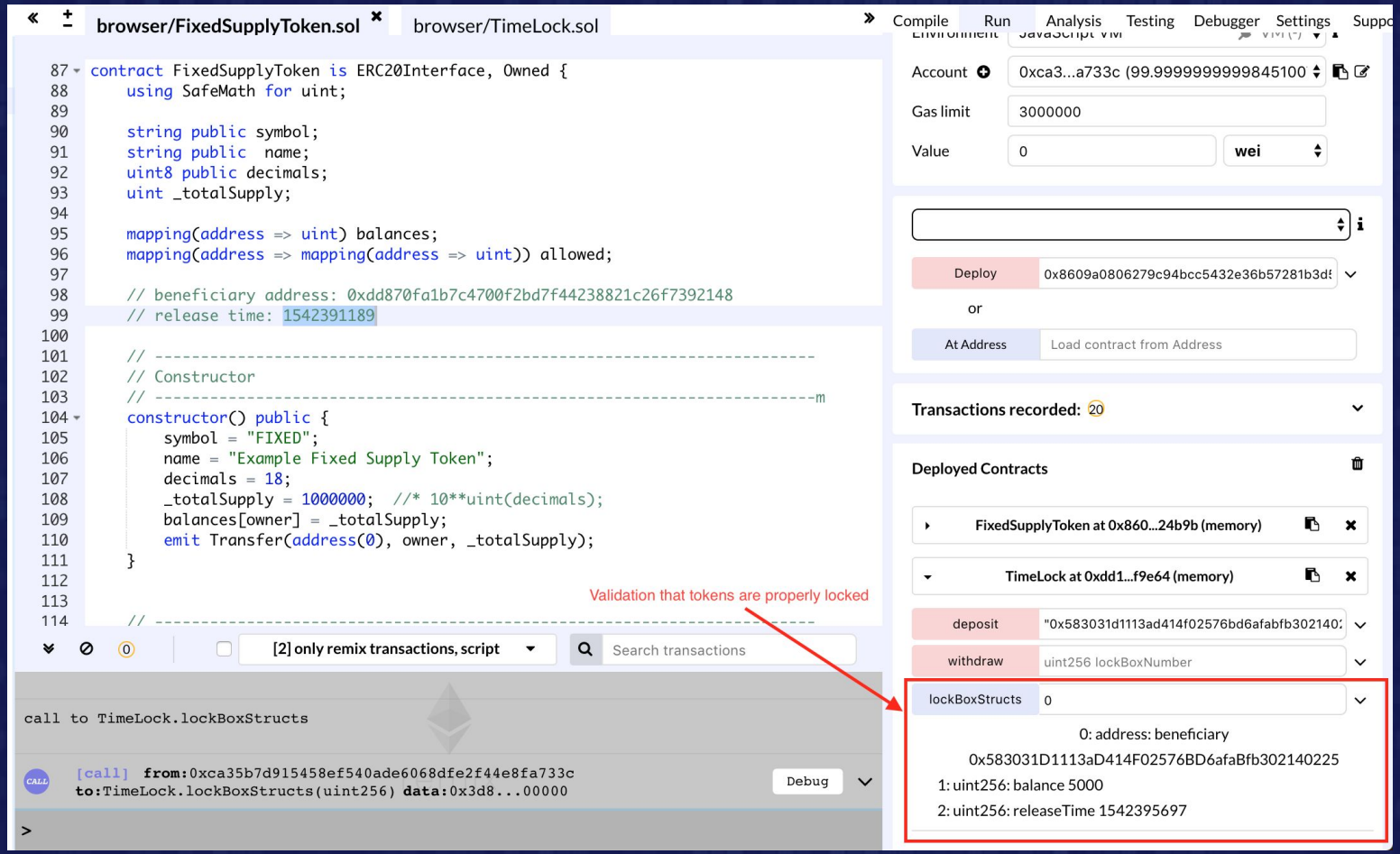
vestvault

Backend Demo



vestvault

Backend Demo




```
87  contract FixedSupplyToken is ERC20Interface, Owned {
88      using SafeMath for uint;
89
90      string public symbol;
91      string public  name;
92      uint8 public decimals;
93      uint _totalSupply;
94
95      mapping(address => uint) balances;
96      mapping(address => mapping(address => uint)) allowed;
97
98      // beneficiary address: 0xdd870fa1b7c4700f2bd7f44238821c26f7392148
99      // release time: 1542391189
100
101     // ------------------------------------------------------------------------
102     // Constructor
103     // ------------------------------------------------------------------------m
104     constructor() public {
105         symbol = "FIXED";
106         name = "Example Fixed Supply Token";
107         decimals = 18;
108         _totalSupply = 1000000;  //* 10**uint(decimals);
109         balances[owner] = _totalSupply;
110         emit Transfer(address(0), owner, _totalSupply);
111     }
112
113
114     // ------------------------------------------------------------------------
```

```
>
```

1. Attract More Investors
2. Increased Regulatory Safety
3. Protection from Internal Theft

Fully integrated END-TO-END System

For enforcing ICOs distribution model

In a decentralized and trustless way

Thank You

Please contact me at:

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Problems with all “Stable Coins”

Dan Raykhman
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Bio

- Fintech veteran
- Built multiple trading platforms
- Ran HFT system
- Designed financial products (ETFs)
- Worked with many Wall St. firms like BlackRock, BNY Mellon, Guggenheim Partners, FTSE, Direxion, etc.
- Speaker, mentor, inventor

"Holly Grail" of Crypto

- Price stability
- Crypto characteristics (decentralization, immutability)
- Cryptocurrency designation (not Security Token)
- Independence from traditional regulation
- Easy convertibility, on/off ramping

"Holly Grail" of Crypto

- How will the price stability be maintained?
- Will this coin be a security?
- Can this coin be shielded from the government's regulation and control?
- How will the convertibility, on/off ramp work?
- What gives investors confidence in the value of stable coin?

Fiat vs Crypto Use Cases

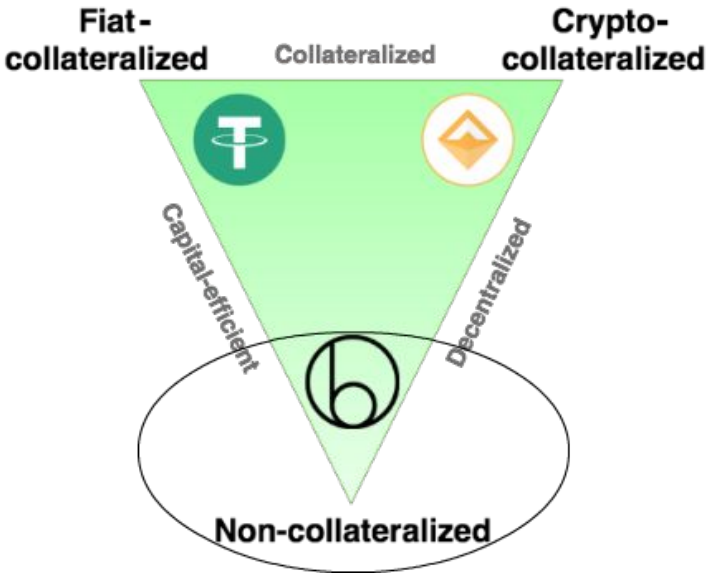
Functions of a Currency

- Store of value
- Medium of exchange
- Unit of account

Cryptocurrency Promise

- Fiat Currency substitute
- Cross border transfers
- Micro payments

Three types of “Stable Coins”



Haseeb Qureshi: **Stablecoins: designing a price-stable cryptocurrency**

Fiat currency backed Coins

- Traditional Custody
- KYC, AML requirements
- Possibility of coin freezing and call back
- Dependence of US banking system
- Creation and redemption friction
- Delegated stability

Cryptocurrency backed Coin

Dai (MakerDAO)

- As “stable” as underlying coin
- Over collateralization
- Limited use case
- C/R friction

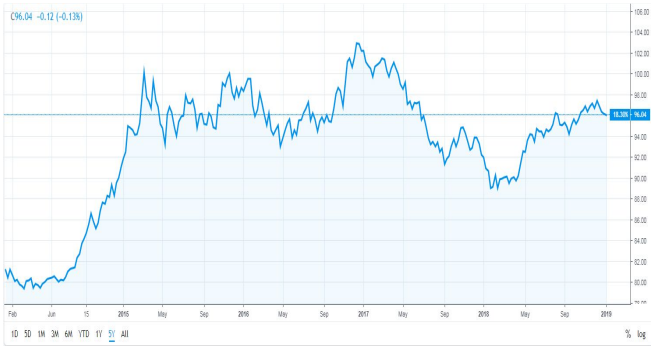
Non-collaterized “stable coin”

BASIS

- Target arbitrary price level
- Pegs need to be defended
- Use of outside resources to maintain the peg
- Unproven and unreliable (prone to “run on banks” scenarios)

Problem with “price-stable” cryptocurrency

Dollar Index DXY



Spot Gold

- Price stability is artificial, needs external mechanism to support it
- There are no “price-stable” assets in the history of finance!
- Value stable assets. Stable Value = Stable Price

Stability as a commodity

Gold vs. S&P 500

- Demand for stability increases when volatility and uncertainty goes up
- Demand for stability goes down when riskier assets performing well

Conclusion

Asset-backed coins have many reasons to exist

- FIAT Currency substitute
- Access to liquidity
- Access to leverage
- Access to assets in a new format

Programmable, price-stable coin probably not

- Need for outside stability
- Reliance on market confidence

Thank You

Dan Raykhman

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Tokenizing Science

Sean T Manion, PhD
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Bio

Science Distributed – CEO, Co-Founder
Blockchain in Healthcare Global IEEE/ISTO – Co-Founder, Treasurer

Science will be Blockchained by 2025

Sean Manion - Published on January 16, 2017 (LinkedIn Pulse)
https://www.linkedin.com/pulse/science-blockchained-2025-sean-manion

What is Science?

- Science is the systematic study of the natural world
- Research is the application of the scientific process: Observe, Hypothesize, Test, Conclude
- Development is the application of basic scientific findings in specific areas like engineering (physical) and medicine (health)
- Research & Development (R&D) is a $2.5 Trillion annual industry worldwide
- $150 Billion Health Science Research annually in the US

Distributed Science Value Proposition

- **Better Science (for Scientists)**
  - Problem: Reproducibility Issues; **20% of U.S. health science research can't be replicated/reproduced***
  - Solution: Improved reproducibility through transparency and immutable audit trail for research data; better quality data from standardization; improved materials; increased meta-analysis capabilities
- **Cheaper Research (for Funders)**
  - Problem: Expensive; decreasing ROI; **$30 billion in U.S. health science on non-replicable research***
  - Solution: Increased return on investment for research dollars spent; reduced data management costs through blockchain/smart contracts, amplified with machine learning/AI; cheaper administration
- **Faster Miracles (for Everyone)**
  - Problem: 17 years from bench to bedside; **2-5 years on administrative processes (my estimate)****
  - Solution: Faster time from idea to treatment; improved outcomes with accelerated research and higher quality data; improved tracking of individual contribution allowing for expanded permissioned access of data to more researchers; faster administrative processes (e.g. IRB, grant review)

* "Economics of reproducibility in Preclinical Research" Freedman et al, PLoS 13(6) e1002165, 2015

** "Enhancing Federal Research: Traumatic Brain Injury & Blockchain Technology - Part 1.5, The Why." Manion, Feb 2018 https://www.linkedin.com/pulse/enhancing-federal-research-traumatic-brain-injury-part-sean-manion-1/

Reasons for the problems with Science

- Scaled beyond optimal function in traditional model
- Siloed across multiple systems
- Trust breakdown; limited sharing
- Misaligned incentives; publishing
- Quality decline with expansion of peer-reviewed journals
- Decreasing return on investment
- **HUGE** upside in application of blockchain and tokenization

Early Efforts to Tokenize Science

- Small number of projects
- Only a handful focused primarily on science
- Recent ICO/STO presale received only 1.62 ETH total in 2 months
- Too broad; one-size doesn't fit all
- No differentiation between scientific disciplines & phases
- Insufficient approach to non-monetary incentive systems
- Ex: 64 million hours of volunteer peer-review each year can not be monetized w/o integrity issues

Distributed Science Opportunities?

Questions to consider across the steps in science:

1. Form Hypotheses	2. Plan research	3. Get Funding	4. Regulatory Approval	5. Collect Data	6. Analyze & Interpret	7. Publish & Present
What hypotheses have already been tested?	What methods are available?	Where are funds?	Can parts of this process be automated?	What are the data standards?	Are analyses tied to original hypotheses?	What are the pre-publication presentations?
By whom? When?	What variations have been developed?	Does my plan match programmatic need?	Will that be faster and more reliable for researchers and regulator?	Will it be mergeable with other studies?	Are analyses outlined in protocol?	What is the quality or confidence level?
What happened? What was the approach?	Are skilled collaborators available? Where?	Have I applied here before?	Can multiple IRBs be aligned?	What are the quality assurance steps?	Justification of new analyses?	How is feedback captured?
What was the result?	Are other resources (i.e. space, equipment) available?	Why am I filling in all this information again?	Can parts of IRB review be crowdsourced?	Is PHI secure?	Record of attempted analyses?	Gray lit?
Current status?		How is the money being tracked?	Can audits be easier?	Is there existing data that can be used?	Statistical power?	What are the comments?
				How accessible is the data?	Lit basis of interpretation?	Are there objective criteria?
				What is the ROI for the data?	Quality of refs? Replicable? Retractions?	Crowd-sourced peer review?

- **Where can things be improved in each area?**
- **Can blockchain/DLT facilitate and/or incentivize?**
- **What is the cost/benefit of implementation?**
- **If it can be achieved w/o blockchain/DLT, why isn't it?**

Distributed Science Publishing Opportunities?

1. Publication Incentives	2. Peer Review	3. Comments & Edits	4. Publication Record
What are the incentives for publication?	How many reviewers?	How are comments captured?	How accessible are abstracts and full manuscripts?
How is contribution and IP tracked?	How big is the pool?	Are responses and edits available?	Reference tracking for appropriateness?
Transparency on fees?	What is the balance for bias?	Can unreported changes inform what should or shouldn't be done in follow up research?	Retractions tracked and alerts to authors referencing?
Funding agencies?	Incentives for review?	**Can this be done in condensed time?**	Funding tracked by dollar through publication?
Incentives for reviewers?	Weighting for review?		**Confidence score gradient?**
	Is crowd-sourcing feasible?		

Roadmap to Tokenizing Health Science

1. **Administrative use cases** - Learn to use the tech; challenges and opportunities identified; value demonstrated with little risk

2. **Regulatory use cases** – Bring efficiency to the IRB review process will speed research; easier regulatory audit process; regulators comfortable with the tech

3. **Working groups** – Established by scientific disciplines and sub-disciplines; semantic standards of the data; include funding agencies, professional societies, and researchers along with those familiar with the tech

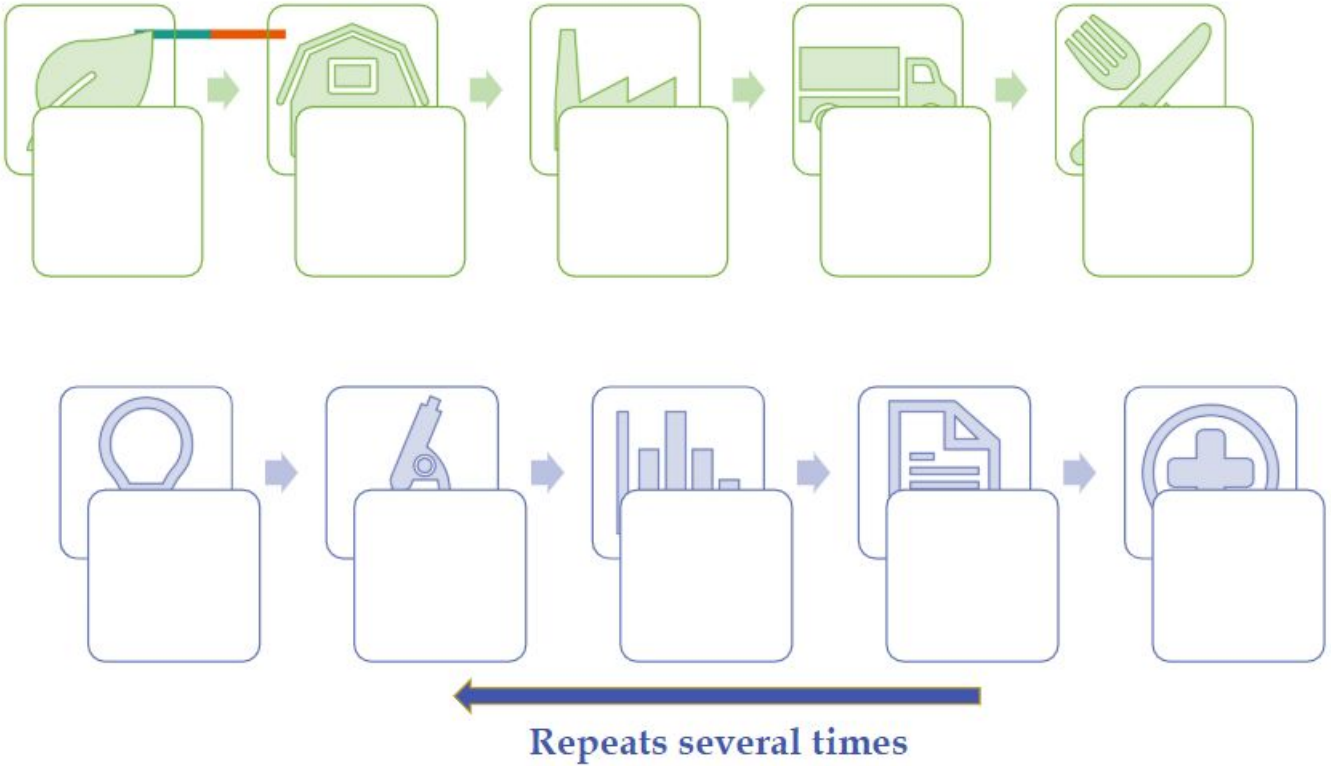
4. **Pilot studies** - Multi-site and cross institutions; sandboxed demonstrations in complex research environments; in parallel w/ current standard data processing for side by side comparison of effectiveness

5. **Economic models** – Map current monetary/non-monetary incentive systems; identify ideal system of exchange; model and refine tokenization strategy

Sean T Manion, PhD - Science Distributed – seanmanion@sciencedistributed.com - 15 Jan 2019

Farm to Table, Bench to Bedside: Health Research as Data Supply Chain

From "Advancing Health Research with Blockchain," by Sean Manion in Blockchain in Healthcare: Innovations that Empower Patients, Connect Professionals and Improve Care (1st Edition); CRC Press, HIMSS Book Series



Food Supply Chain

- Linear progression
- Timeline: < 30 days*
- Key variables: type, quantity, quality, variables (e.g. temp)

Health Research Data Supply Chain

- Parallel progression
- Timeline: 2-5yrs (x multiple repeats)
- Key Variables: design, methodology, patient demographics research contribution, statistical approach, outcomes

Challenges for Blockchain in Science

- **Administrators are risk averse**
  - Regulators are wary of the unknown
  - Acquisition standards matter
  - No incentive for innovation
- **Researchers are complex**
  - Science is a complex system
  - Layered incentives; $$ only one
  - Want input on protocols
- **Developers assume simple, clean data**
  - Research data is messy, non-standardized
  - Research partially centralized/distributed
  - Central and single node intermediaries

Review: Tokenizing Science

- **When:** Science will be blockchained by **2025** with a functional tokenization model by **2027** (*and Samson Williams will owe Sean Manion a steak*)
- **Why:** Better Science, Cheaper Research, and Faster Miracles
- **How:**
  - Grass roots pilots leading to multi-site studies
  - Funding agencies piloting and moving forward requirements
  - Research administration innovating for value (Lives, $$$)
  - Independent standards development
  - Refined token models capturing monetary & non-monetary economics
- **Who:** Researchers, technologists, administrators, investors, patients/caregivers, policy makers, economists, businesses, non-profits, federal agencies, and me…

Thank You

Sean T Manion, PhD (*Science Distributed, Blockchain in Healthcare Global IEEE/ISTO*)
seanmanion@sciencedistributed.com