How Blockchain will Disrupt the Real Estate Industry

May 22, 2018

Athena Blockchain/ChromaWay 5/23/18
About Athena Blockchain

Advisory/Investment Banking for Tokenized Investment Products
▪ Investment Banking
▪ Sales & Trading
▪ Asset Management
▪ Investment Research

Offices: Chicago, Miami, LA
ChromaWay Overview

Enterprise Blockchain Software
Company
- Founded: 2014
- Bitcoin 2.0 (First)
- LHV Bank, Swedish Land Registry, Andra Pradesh Land Registry, and LHV Bank, New South Wales Land Registry, Funderbeam, Green Bonds

Profile
- HQ: Stockholm, Sweden
- Hybrid Open Source
Our Platform

- Consortium Database
- Secure Workflow with Smart Contracts
- Flexible Tokens

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Agenda

1. Introductions
2. Blockchain: A Primer
3. Blockchain and Crypto Currencies in Real Estate
4. Q&A
What We Will Cover Today

- How Blockchain technology is a Real Estate industry disruptor
- Blockchain basics
- Digital Currency basics
- US tax implications of digital currencies
- ICO’s/Token Sales
- Use Cases
Types of Trust Relationships

- **local**
- **institutionalized**
- **distributed**
Features of Decentralization

- **Architectural** — how many **physical computers** is a system made up of? How many of those computers can it tolerate breaking down at any single time?

- **Political** — how many **individuals or organizations** ultimately control the computers that the system is made up of?

- **Logical** — does the **interface and data structures** that the system presents and maintains look more like a single monolithic object, or an amorphous swarm?
Benefits of Decentralization

- **Fault Tolerance**— decentralized systems are less likely to fail accidentally because they rely on many separate components that are not likely to fail.

- **Attack resistance**— decentralized systems are more expensive to attack and destroy or manipulate.

- **Collusion resistance**— it is much harder for participants in decentralized systems to collude to act in ways that benefit them at the expense of other participants.
Trust Models: Food

Food Stand @Farm (Local)

Grocery Store (Institutional)

Farmers Market (Decentralized)
Trust Models: Real Estate Lending

Home Loan Bank (Local)

Bank (Institutional)

Secondary Market (Sort of Decentralized)
What is Blockchain?

- Blockchain technology enables users to share their ledger of transactions
- Record of events are distributed to all participants in a given network, who in turn use their computers to validate the transactions
- No need to have a third party intermediary such as a bank or central clearing center
- Blockchain records can only be updated by consensus
- Information can never be erased – providing a detailed audit trail of all associated events
What is the Value of Blockchain?

Cost and Efficiency
• Removal of non-value add intermediaries
• Reduced transaction costs
• Availability of transparent and real time data

Controls and Data Quality
• Ability to ensure identity of participants
• Data based consensus to improve controls
• Tamper proof/immutable records
• Complete transaction history, ease of traceability

Security
• Signed transactions
• Smaller attack surface (e.g. data is distributed, not merely replicated)
Centralized Data Sharing

- Central control of data
- If the security of the authority is compromised, the data can be altered, or even deleted.
- Costly for central authority to manage interfaces.
- Data commonly out of sync with partners.
Blockchain Data Sharing

- Each partner (node) participates in common data administration

- The system collectively verifies new additions to the common record source (i.e. blockchain)

- Guarantees the security of the network, tamper resistance

- Cost for the system is amortized across the network
(Most) Blockchains Exhibit Four Features

- Shared Data Ledgers
- Hashes and Digital Signatures
- Consensus Mechanism
- Immutable Data Blocks
Blockchain is a Shared Database

- Designed to ensure consistency
- The database is managed by network peers rather than a central authority
- All users on the blockchain maintain an identical copy of the ledger.
Participants in a Blockchain Network
Public Blockchain Nodes
(Distribution of Bitcoin Blockchain Miners)
What is a Consensus Algorithm?

Allows a collection of computers to work as a coherent group that can survive failure of some its members and coordinate data state.
How is Data Stored in the Blockchain?

Each block includes the following information:

• Unique identifier (Hash)
• Previous block identifier (Hash)
• List of transactions (Alice sold a car to Bill)
• Time Stamp (Date & Time)
A Blockchain Transaction

1. Someone in a network requests a transaction.

2. The transaction is broadcast to other computers (nodes) in the network.

3. The network of nodes validates the transaction using agreed algorithms.

4. The verified transaction is combined with other transactions to create a new block of data for the ledger.

5. The new block is added to the network’s blockchain, in a way which is permanent and unalterable.

The transaction is complete.

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dApps Run on Blockchain Networks

- Commonly Referred to as Distributed Applications (dApps)
- Programs that are built on top of blockchain layers
- Run on multiple systems simultaneously for a single task or job
Types of Blockchain Ledgers

- How many copies of the ledger?
  - One
    - Traditional ledger
    - E.g. personal bank account

- Who can read these copies?
  - Owner group
    - Private shared ledger
  - Trusted ledger participants
    - Public trust shared ledger

- Who can write to the ledger? (and maintain its integrity)
  - Any user by untrusted consensus
    - Public no-trust shared ledger
## Ledgers Have Different Characteristics

<table>
<thead>
<tr>
<th></th>
<th>PUBLIC</th>
<th>PERMISSIONED</th>
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</thead>
<tbody>
<tr>
<td>ACCESS</td>
<td>Open read/write access to database</td>
<td>Permissioned read/write access to database</td>
</tr>
<tr>
<td>SPEED</td>
<td>Slower</td>
<td>Faster</td>
</tr>
<tr>
<td>SECURITY</td>
<td>Proof-of-Work/Proof-of-State</td>
<td>Pre-approved participants</td>
</tr>
<tr>
<td>IDENTITY</td>
<td>Anonymous/Pseudonymous</td>
<td>Known identities</td>
</tr>
<tr>
<td>ASSET</td>
<td>Native Assets</td>
<td>Any Asset</td>
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<tr>
<td>COSTS</td>
<td>Expensive</td>
<td>Cheaper</td>
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Projects Cut Across Crypto & Enterprise

- Crypto-Oriented Projects (Public)
- Enterprise Projects (Permissioned)
A Diverse Set of Blockchain Projects

- Real Estate
- Land Registration
- Provenance/Authenticity Systems (supply chain)
- Capital Markets/Value transfer systems
- Identity systems
- IOT
- Prediction Markets
- Storage/Cloud
- Digital Advertising
- Decentralized commerce
First of Breed: Bitcoin

Decentralized, internet-operated, peer to peer value exchange system
- Created in late 2008 by “Satoshi Nakamoto”
- Key Innovation: Participant consensus without a TTP
- Cryptography to ensure:
  (a) validity of transaction submitted and
  (b) create “immutable” records
- Users identified/participate by cryptographic keys/wallets
- No native physical form
- Volatile valuation based on “trade markets”
Economic and Game Theory Perspective

- Assets distributed by software to miners
  - Miners incentivized to encourage use
- Capped asset distribution = Deflationary
- Liquid conversion into cash, cash equivalents
- Other commercial uses for bitcoins
A Fad?

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Legal Basics:

Cryptoassets Generally:
- Legal to own & transact
- Illegal to transact for restricted goods
- Subject to Federal law: SEC, CFTC, IRS, DOJ, DOT
- Varying state laws: NY BitLicense

Money Transmission/Laundering:
- Generally not considered currency
- Businesses that buy & sell are likely MSBs: Federal and state registration
-- BTMs/Exchanges require full banking compliance (i.e. AML/KYC/BSA/OFAC)
Death... and Taxes

- **IRS Notice 2014-21**: Cryptoassets (DVCs) are generally considered to be property
  - Payment in DVC is income to recipient (like cash), but recipient must value the DVC (like property)
  - FMV valuation based upon aggregated exchange rate from credible exchanges (if they exist)
  - Payor recognizes gains or losses (generally at capital gain rates) based on tax basis in the DVC transferred to buyer
  - Determination of tax basis for each DVC can be a significant headache
  - Subject to withholding for any employment tax, and information reporting as required for any other payment in property
Open Questions:

- Will cryptocurrency held outside the US be subject to FBAR and FATCA reporting?
  - Yes. (But it’s a wrong conclusion - what is “held”?)
- Will the 10% FIRPTA withholding tax apply?
  - Assume Yes
- Will the IRS accept payment (including any withheld tax amounts) in DVCs?
  - Doubtful (but Seminole County, FL)
- Will use of DVCs lead to greater audit scrutiny by the IRS??? Yes.
- Will much of the hoped for anonymity be lost by intrusive IRS information requests? Yes.
Blockchain Landscape
Blockchain by Type
ICO/Token Sales: (pre 6/25/17)

Why sell tokens?
- Fundraising
- Distribute Assets
- All tokens are not alike
- Token sales distinguished from IPOs
  - Typically zero investor protection
  - Minimal disclosures
  - Uncertain rights, mutuality of obligation
  - Not distributed via broker-dealers
- Questionable Issuer Incentives
- Questionable communication of rights/ responsibilities of participants
SEC Issues Investigative Report Concluding DAO Tokens, a Digital Asset, Were Securities

U.S. Securities Laws May Apply to Offers, Sales, and Trading of Interests in Virtual Organizations
ICOs Post-SEC

1. Howey Test
   Investment of money
   Common enterprise
   Expectation of profit
   From efforts of promoter or 3rd party

2. Not all Tokens = securities
   - commodity
   - prepay for service
   - more than “passive” investment
   - currency

3. If a Security:
   - IPO
   - Exempted Offering:
     - Reg D
     - Reg S
     - Reg A+
     - Reg CF

4. Regulatory problems persist:
   - Custody
   - Fiduciary Duties
   - Clearance
   - Settlement

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Part II – Blockchain and Real Estate Use Cases
Elements of Real Estate Blockchain

Signatures  
Contract  
Witness  
Workflow
How Digital Keys Works...
Smart Contracts, Defined.

- Defining a Smart Contract
  - Nick Szabo: from Hero of Alexandria to Auto Starter Interrupters
  - Oracles, dispute resolution, and other systemic problems
- If you have code, you still need law
- Does my smart contract create a legally enforceable agreement?
Legal versus Smart

• Is a smart contract a legal contract?
  • Not always
• How can parties to a smart contract avoid unintended consequences?
• When do you use these?
  • Regulatory Arbitrage
  • Routine transactions of value
  • Building bridges between bricks and bytes
Blockchain Smart Contracts

- Ethereum: “Worldwide computer”
  - Token of value also used to obtain computing services
- First of several: Hyperledger, Neo, Ubiq, Omni, Counterparty, Rootstock
- Choice of Platform:
  - Governance
  - Persistence
  - Development team
TheDao, or why contracts still matter.

Case Study: TheDao Smart Contract

• TheDao smart contract platform
• Kicking open Pandora’s box (i.e. unintended consequences)
  • Code quality is critical
  • Document your agreement
  • Include dispute resolution mechanisms
Smart Contracts & Real Estate

• Add efficiency and reduce costs and errors for routine financial transactions:
  • Escrow
  • Payment for tenancy
  • Investment models

• Elimination of intermediaries:
  • Escrow agents, Land Title Recorders, Title agents, Notaries

• Better data security/privacy
Existing Challenges to Widespread Smart Contracts Use

- Bad code
- Maturity of oracle technology
- Bad law
- Resistance by entrenched market actors
- Adaptation by existing gatekeepers
Notarization on the Blockchain?

- An individual creates a digital signature only accessible for a specific person (so called private key) via a trusted entity.
- This signature may be stored on a blockchain (time/date stamped/hashed).
- The signature may be electronically connected to a document, which is then stored on the blockchain.
- Parties would no longer have to be physically present in front of the notary to ensure their identity.
- Multi-Signatures Wallet

- Witness and certify the validity of signatures on documents.
- Certify the authenticity of the documents themselves
Real Estate Blockchain

Blockchain Real Estate Projects

- Land Title Record Systems
- Decentralization Plays
  - MLS
  - Ownership transfer systems
  - Price Discovery platforms
  - Rental/Lease platforms
- Investment
- Smart Contracts vs. escrow
A Blockchain RE Ecosystem is Emerging
Applications for CRE

Industry Overview: Challenges & Opportunities
Rising costs are pushing industry leaders to take greater risks for positive change

Real Estate Documentation: Antiquated traditional paper systems are conducive to fraud and forgery. System efficiency is low, manual errors happen often, and record-keeping is open to theft and human error

Property Mgmt.
- Commercial & Residential Leasing
- Building Technology

Leasing & Technology: Managing properties and tenants, and enforcing the agreements around lease terms requires a better platform for consensus and reference as well as payments

Registry & Data
- Document Verification
- Anti-Fraud
- Analytics

Buying & Selling
- Due Diligence
- MLS

Purchase Process: Searching for properties, vetting, and entering into terms of sale is an extensive and unnecessarily complicated effort that can discourage investment

Blockchain technology can address multiple issues in fraud, leasing management, and property acquisition

Source: Deloitte
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Use Case #1 - Smart Lease Contract

Benefits:

- Instant settlement and management of cash flows
- Simplified property management
- Legally enforceable contracts
- Faster reconciliation of payments
Swedish Land Registration
Best-Fit Environment for Evaluating Blockchain

- All land divided into properties
- All properties are registered (Torrens-like)
- The Land Register also contains information about mortgages, encumbrances, bankruptcy, restoration orders etc.
- Register backed by state guarantee
- Mortgages only by title holder
Sweden 9th Globally – Land Registration

Source: http://www.doingbusiness.org/data/exploreeconomies/sweden#registering-property
Background to the Project

- Project initiated in 2016
- Partners:
  - Swedish Land Registry (Lantmateriet)
  - ChromaWay
  - Kairos Futures
  - Evry
  - Telia
  - SBAB, Landshypotek Bank
  - Other government agencies
The Land Registry in the blockchain - testbed

A development project with Lantmäteriet, Landshypotek Bank, SBAB, Telia company, ChromaWay and Kairos Future

March 2017

White Paper on Project (March 2017)
Current Process

- Land registry involved very late in the process (Step #28)
- Limited data re-use. For example, information in the purchasing contract is written again into the bill of sale
- Process time is unnecessarily lengthy
- Documents signed on paper, sent by regular mail
- Identity checking is done manually
Land Administration System

Target for Blockchain Initiative

Conveyance Ecosystem
- Buyers
- Sellers
- Attorneys
- Appraiser
- Lenders

Conveyance

Non-Spatial
- Deeds
- Titles
- Encumbrances

Land Records Database

Data Sharing

Spatial Data
- Parcels
- Land Use

Land Administration System

Land Development Ecosystem
- Developers
- Lenders
- Investors
- Data Vendors
- Businesses

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Conveyancing Process in Sweden

1. Purchase Negotiations
2. Purchase Agreement Signed by Buyer & Seller
3. Purchaser Pays Deposit
4. Agent will issue a bill of sale (Kapebrev).
5. Bank forwards the bill of sale to the Land Registry
Conveyance on the Blockchain

Buyer & Seller

Other Parties

Blockchain Nodes

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Using the contract, the participants log commitments in the form of signed messages to a blockchain, where they are permanently stored. All the messages of a contract form a sequence, a chain, of messages. Each message is signed by one or more participants.
The Real Estate ICO?

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What is the Ethereum ERC-20 Protocol?

- Ethereum built upon Bitcoin’s blockchain model adding programmatic smart contracts.
- ERC-20 defines a set of standards for token developers to use that allows new tokens to borrow much of Ethereum’s infrastructure, including mining, and wallets. This allows developers to program how new tokens will function within the Ethereum ecosystem.
- There are currently >84,000 token contracts.
- ERC20 defines the following functions: balanceOf, totalSupply, transfer, transferFrom, approve, and allowance. Optional fields include: token name, symbol, number of decimal places.
Example of Ethereum Token

Investors

Investments

Digital Tokens issued

Ethereum Platform

Strategic Partners

Renewable Energy Company

Local Communities

Land Owners

Production Company

Green Energy Projects
Bigger than Airbnb!
Urbit Data it's the next REVOLUTION of the Real Estate market
Disrupting a Multi-Trillion dollar industry
RE Blox - Overview
Details of Token Sale

Token Information

- **Token Supply**: 600,000,000 urbit tokens
- **Scheduled Pre-Sale Dates**: June 2018
- **Pre-Sale token Price**: USD $0.10/token with a 30% bonus
- **Scheduled Public Sale Dates**: TBC
- **Public Sale token Price**: USD $0.10/token with up to 25% bonus
- **Hard Cap**: USD $19 million
- **Soft Cap**: USD $3.5 million
Is this a fair allocation?

Token Distribution

The 600 million tokens will be distributed as follows:

- 20% Retained
- 25% Public Sale
- 25% Rewards - Mining
- 5% Team & Founders
- 5% Pre-Sale
- 4% Bounty & Marketing
- 4% Advisors

Token Allocation

After-sale allocation of Resources:

- 5% Legal Regulations
- 10.00% Reserved company funds
- 13% Growth strategies
- 45% Technology & Development
- 27% Marketing & Promotion

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The U Coin

• As incentives, a digital currency called U Data coin - or U coin – will be created, freely interchangeable among all participants. Market participants will either receive rewards in form of coins, if they contribute to the Blockchain with data or services. Or they have to pay fees in form of coins when they take advantage from the ecosystem, but don’t contribute. This ensures that all participants have an incentive to use the ecosystem.
RE Ecosystem of Coin
U Coin in Action – Property Purchase
Purchase/Sale of Property

1. When the user is interested in a property, he opens a negotiation channel with the person who made the publication. Said channel will transparently offer the U Data Value analysis tools so that both parties can reach a price agreement.

2. Using the U Data Owner platform, users can verify the identity of those involved in the transaction, as well as the ownership of the property and its purchase/sale history. The platform can offer advice of business this advice will be paid in URB coins.

3. By accepting the offer, the buyer must send the amount in U coins to an U Data escrow service that is in charge of maintaining the funds while the legal operation is being executed. This transaction is written into the blockchain as an operation in process.
Process - Continued

4. Once the amount is verified by the escrow service, the seller of the property is notified that the payment is in the platform and the vendor verifies the payment and initiates the legal process.

5. Once the legal process is completed, the seller and buyer confirm the transaction and the funds are transferred from the escrow service to the seller.

6. If the seller or the buyer fail to confirm the operation, a dispute phase begins for the property. This dispute is resolved by users of the U Data Finder network who are in the locality of origin of the dispute and rewarded in U coins for participating. The dispute system will use a Proof of Stake mechanism where the "Judges" will "pay" U coins to resolve a dispute, if the dispute is successfully resolved they will receive their coins plus a reward.
Recommendations for Real Estate Professionals

- Continue to monitor blockchain to evaluate impacts on industry and your role.
- Identify the TYPE of blockchain project that you might want to participate in.
- If permissioned blockchain, determine your role in a consortium and the VALUE of participation.
- If public blockchain (e.g., token-based), determine the economics—and legality of participation.
- If exploring use of crypto in business, understand benefits and risks.
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Appendix
Real Estate Closing

**Typical Flow of Funds**

1. Buyer provides sales funds
2. Buyer sends funds to disbursement agent
3. Disbursement agent disburses funds

- Buyer $$$$  Disbursement Agent $$$$  Taxing Authority
  - Seller
  - Lender
  - Satisfy Title Issues
  - Miscellaneous

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Closing Time

Regulatory Considerations

- USA PATRIOT ACT
- President’s Executive Order #13224
- OFAC Special Designated Nationals and Blocked Persons list (SDN)
- State-specific Good Funds Regulations
- Geographical Targeting Orders
Regulatory Compliance in a Real Estate Transaction Funded with Cryptocurrency:

“It’s Complicated”

Good Funds:
- Funds must be immediately available
- State by State specific rules

What matters more - the Identity of the Person or the Payor Account?
- Inherent Pseudo-anonymity
- Bitcoin Explorers - proof of transfer
- Processors - Intermediary step between Bitcoin wallet and payor account

How far of a “look back” is necessary under the Patriot Act?
Reports from the Field:

Structures being used in the wild:

- Buyer BTC> Via MSB> USD> Disbursement Agent> Disburse
- Buyer BTC> Via MSB> USD> Seller> Disbursement Agent> Disburse
- Buyer BTC> Via MSB> USD> Buyer> Disbursement Agent> Disburse

Issues:
- GTO’s and look backs?
- Buyer and MSB Affidavits
- Indemnification & Hold Harmless
- Compliance-Related Representations/Warranties

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Real Estate Blockchain

Problems:

Smart contracts are not “smart” or “contracts”
“Garbage in, garbage out”
Technical issues
Legal/social/behavioral/political
Decentralized Application: Money

User Onboarding Information

Accounting & Recordkeeping

Management Oversight

Blockchain (Distributed ledger)

Public Key Cryptography
R897jik45903N99954398
(Unique Digital Identity)

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