



B L O C K C H A I N



A PRIMER ON BLOCKCHAIN
TECHNOLOGY & CURRENT
APPLICATIONS

OUTLINE

01

Blockchain Basics

- Technology
- Tokens
- Wallets
- Exchanges
- Smart Contracts

Finance

- Blockchain Applications
- Asset Tokenization
- Fundraising 2.0
- Initial Offerings

Business Process Optimization

- Supply Chain Management
- Modern Energy Markets

Digital Identity & Ownership

- Data Protection, Control & Access Rights
- Opportunities & Business Cases

BLOCKCHAIN BASICS

Philosophical Underpinning

Individuals and organizations should be able to store, validate, and transmit data in a secure way without intermediaries

What Is It?

- A database hosted simultaneously by numerous network participants in a global & distributed manner
- A digital record of transactions made between parties

Borderless: A globally connected network

Resilient: No single point of failure

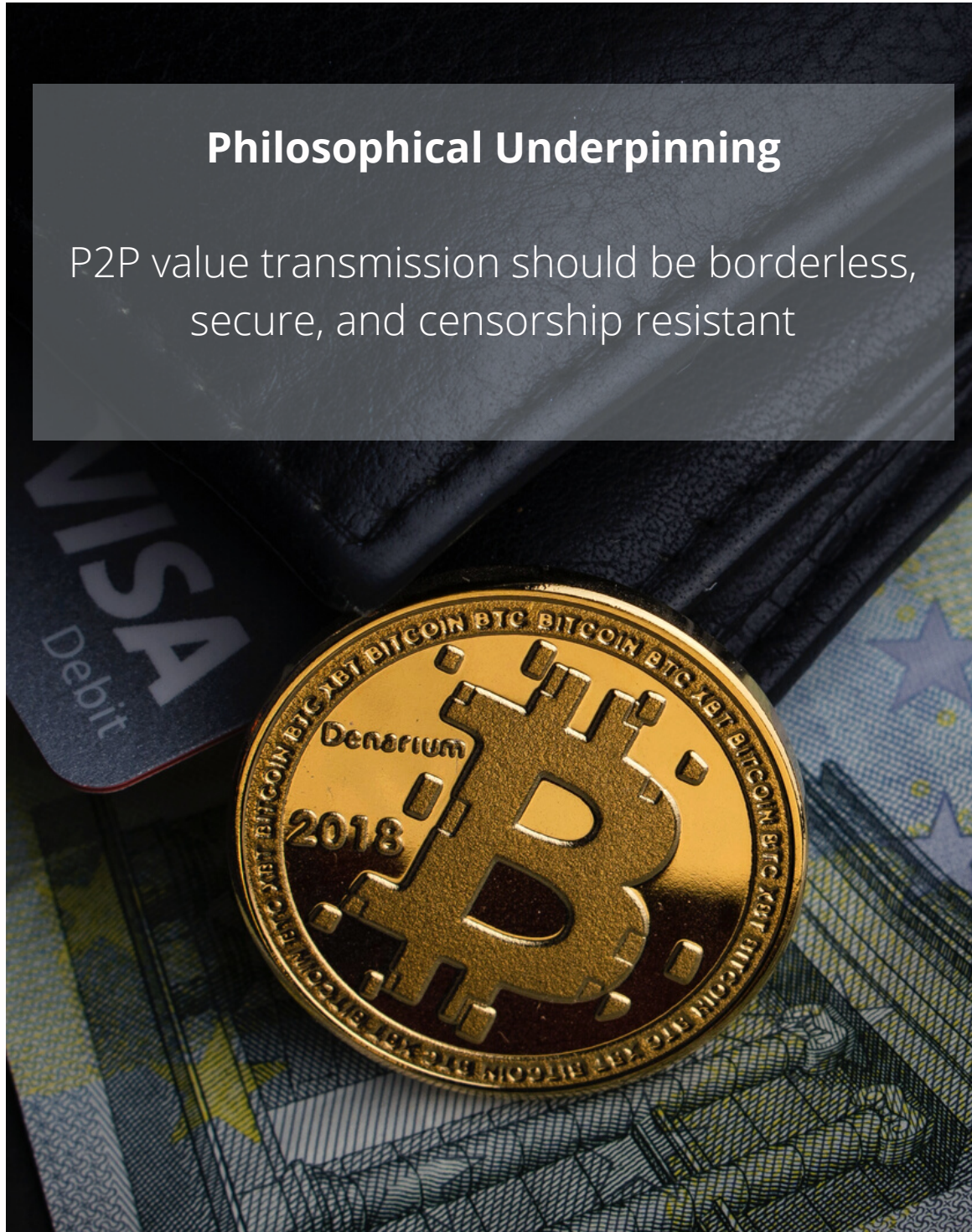
Immutable: Once information is stored the record is timestamped & archived

Transparent: Publicly accessible/readable*

* Public vs Private blockchains

Philosophical Underpinning

P2P value transmission should be borderless, secure, and censorship resistant



FOCUS: Bitcoin

- The world's first blockchain (Satoshi Nakamoto, 2008)
- A novel way to transact with digital value (decentralized)
- Overcame 'Double-Spending Problem'
- Allows for micro-transactions (0.00000001 BTC) (10 'satoshi's' = 0.001 USD)
- Low transaction fees

Borderless: "Internet Money"

Free Market Economy: Not tied to the monetary policy of any state or organization

Deflationary: Limited supply (21 million)

TOKENS



What Are They?

- Assets (digital), digital ownership rights over assets (digital/physical), or access/usage rights
- Ownership and transfer tracked on a blockchain

Payment Token/Cryptocurrency: Used like cash (Bitcoin, Ether [Ethereum], Litecoin)

Utility Token: Grants access/usage of a utility or platform (filecoin, siacoin)

Security/Asset Token: A digital guarantee of ownership over an underlying asset

Hybrid Tokens*

CRYPTO WALLETS



What Are They?

- Store, send and receive tokens

Hot Wallets: Storage connected to the internet (app/software, exchange accounts)

Cold Wallets: Offline storage (paper, hardware)

How Do They Work?

- Public/Private key encryption

Public Key: The publicly visible 'address' of your wallet

Private Key: A private passcode which is needed to 'sign'/authorize transactions

EXCHANGES



What Are They?

- Digital platforms which allow for tokens to be traded for other tokens and/or fiat currencies

Centralized Exchanges: Create markets and liquidity for trades by matching buyers & sellers

- Fee %
- Require temporary token custody
- Require AML/KYC
(Binance, Coinbase)

Decentralized Exchanges: Facilitate P2P trading

- 0 or low fees
- No token custody
- No KYC/AML (often)
(0x, uniswap, Waves Dex)

SMART CONTRACTS

What Are They?

- Computer protocols intended to facilitate the enforcement/execution of agreements between parties
- Revolve around the transfer of digital assets (tokens) between parties

Conditional: If (x) then (y) conditions are negotiated by parties and encoded into the blockchain

Automated: Automatically execute once threshold conditions are met

Immutable: Once executed, token transfers are final

* Data input quality/veracity can be a concern. Oracle choice is incredibly important.



FINANCE



Blockchain Applications

Optimize & Expedite: Finance supply chains (e.g. clearing, settlements etc.)

- Fee reductions for cross-border payments
- Increased transparency

Go to (Public) Market:

- Cheaper
- Faster
- Less Complicated

Asset Tokenization: Fractionalization of assets (physical & digital)

- Stocks, bonds, certificates, IP rights, real estate, collectibles
- Liquidity
- Access
- Transparency

INITIAL OFFERINGS



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What's In A Name?

ICO: Initial Coin Offering: Primary issuance of payment & utility tokens

STO: Security Token Offering

IEO: Initial Exchange Offering: Issuer outsources client onboarding processes and primary issuance to an exchange

FUNDRAISING



Crowdfunding 2.0

- Direct B2C/P2P (no platform fees)
 - Microdonations
 - Streamlined admin/accounting procedures
- + Transparency
+ Accountability



FOCUS: Commodity Tokenization

Tokenize: Security token representing ownership rights over an underlying commodity

Fractionalize: Asset can be split up into any number of 'pieces' Investors are free to choose the exact amount they would like to purchase

Results:

- Increased liquidity for issuers and investors
- Democratization of capital markets
- Fee reductions for all parties



FOCUS: Equity Tokenization

Token is paired or 'twinned' with company shares meaning that token transfer is recognized under civil law as a transfer of the share itself (CH, LI)

- Simplified issuance
- Fee reduction
- Streamlined accounting and administrative procedures

INDUSTRY SUPPLY CHAIN MANAGEMENT



Supply Chains

- Life-cycle of a product/service from creation to delivery

Blockchain Application 1: Traceability & Provenance

Blockchain Application 2: Integration with IoT for Process Automation & Real-Time Performance Tracking



FOCUS: Global Fish Markets

Catch: An RFID chip and/or QR code is physically attached to the product. GPS coordinates are logged and time stamped on the blockchain and linked to the unique identifier.

Transport: Receipt of product is logged as RFID/QR are scanned or interact with ship/truck ID.

Conditions of transport (temp/humidity/location) are logged and linked to product.

Processing: Receipt of product is logged as RFID/QR are scanned or interact with facility ID. Conditions of Processing are logged and linked to product. New linked QR code is attached to processed product.

Consumer Sale: Customer scans QR code and can access the timestamped & logged history of the individual product.



FOCUS: Smart Factories

- Highly digitized and connected production/manufacturing facility
- Relies heavily on interoperability of components/machinery

Blockchain Integration:

- Real-time monitoring and time-stamped logging of factory conditions + component performance and interaction
- Automization of 'next-step'/financial transactions- i.e. replacement parts, maintenance contracting, etc.

*Cannabis production



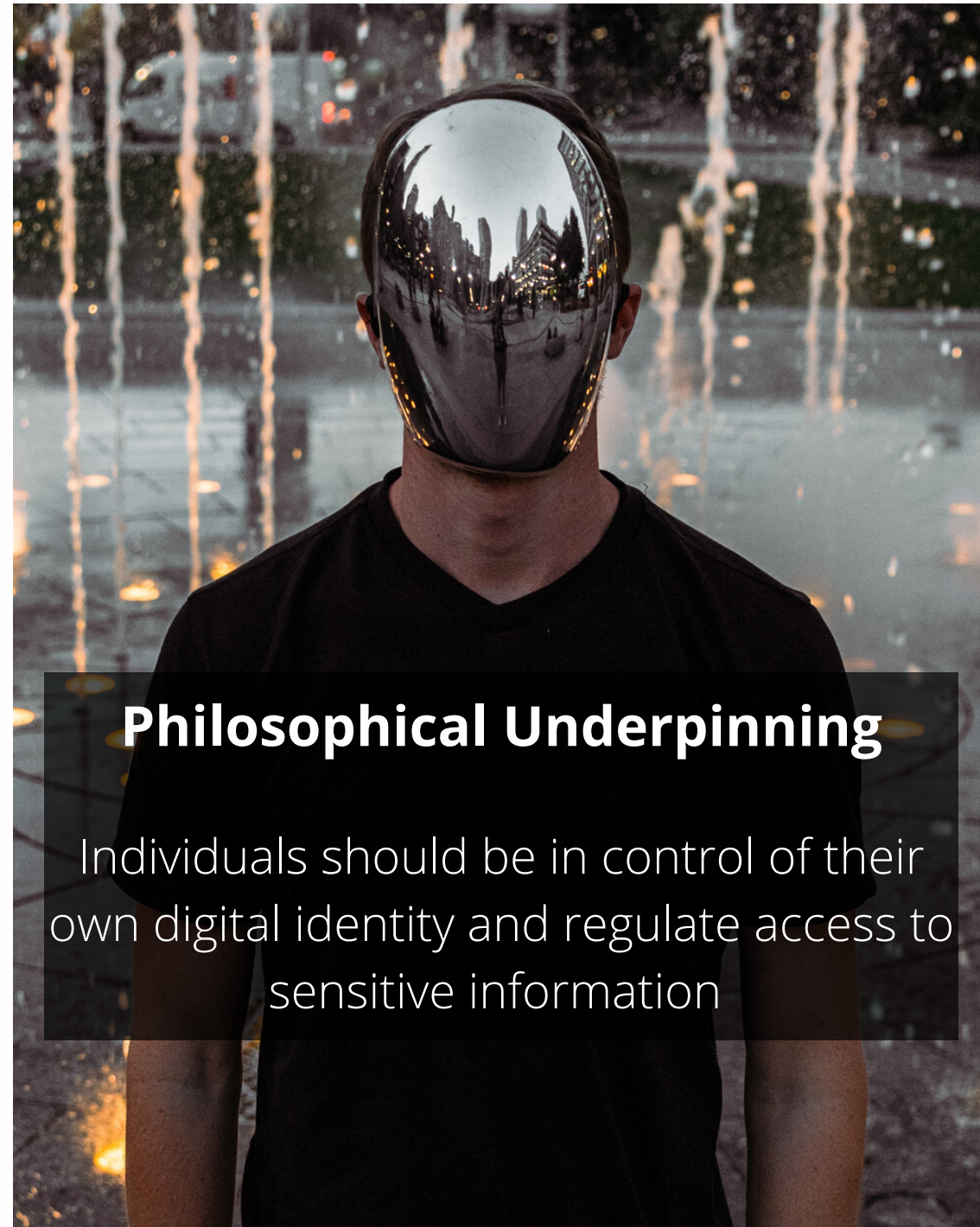
FOCUS: Modern Energy Markets

(R)evolution: Changing nature of energy production & market participants

Prosumer Class: Individuals and groups are entering the market producing/buying/selling energy

Blockchain & Smart Contracts: Real-time monitoring and dynamic, condition-based purchase and sale: micro-large scale transactions. Transparent and streamlined multi-party accounting processes and provenance guarantees.

DIGITAL IDENTITY



Philosophical Underpinning

Individuals should be in control of their own digital identity and regulate access to sensitive information

Current Situation

Out of Control: Sensitive personal information is held by any number of private parties on the internet with disparate levels of security and oversight

No Accountability: Data protection policies are often opaque and leave much to be desired

Vulnerable: Knowledge of trivial information in the wrong hands can compromise accounts



FOCUS: Healthcare

Situation: Health professionals require the capacity to access existing and generate new patient information

Problem: Who/What/Where/When + System Interoperability

Modern Consideration: Integration of data from wearables

Solution: Blockchain-powered patient history

- Authorized, attributable and time-stamped data entry
- 1-time access requests
- Access gateway controlled by private key signature of individual



FOCUS: Insurance & Banking (Loans)

Situation: Institutions require access to certain sensitive information in order to conduct accurate risk assessments

Problem: Level of required disclosure, access control, accountability

Solution: Blockchain-powered access control & 'Zero-Knowledge Proofs'

BLOCKCHAIN IN 3 WORDS

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DECENTRALIZE

- Overcome need for (many) intermediaries
- Spread risks globally

OPTIMIZE

- Further automate processes
- Enhanced provenance

TOKENIZE

- Fractionalize assets
- Democratize Markets