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Blockchain Technology & Crypto Currency – A Primer

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Blockchain Technology

What is it?

What is a Blockchain?

"A blockchain is a data structure that makes it possible to create a **digital ledger** of transactions and share it among a **distributed network** of computers. It uses **cryptography** to allow each participant on the network to manipulate the ledger in a secure way without the need for a central authority."

Blockchain at Berkley (https://blockchain.Berkeley.edu/)

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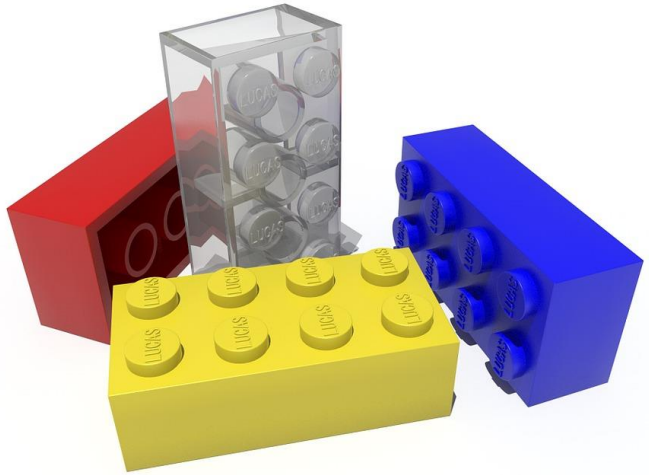
Why blocks?

The ledger records transactions in “blocks”.



- Each block contains a “cryptographic hash” of the previous block, a timestamp and the transaction data. Once the data is recorded in a block it cannot be altered without having to change every block that came after it, making it impossible to do so without it being seen by the other participants on the network.

Cryptographic Hash: Information that is converted into a value that can be used to identify/prove the information but can’t be used to recover information.

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What Makes Blockchain "Special"

- No central point of failure/reduction in systemic risk
- Elimination of intermediaries/reduction in operational costs
- Irrevocable and transparent transactions
- (Near) Real-time settlement
- Improved security/fraud minimization

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What are the challenges facing Blockchain?

- Transaction speed (only near real time)
  - This isn't Visa…yet
- Energy costs (of mining)
  - ING published a paper that a single Bitcoin transaction consumes enough energy to power the "average" household for an entire month
- Recentralization
  - Where there is money to made…
- Lack of regulation (supportive or otherwise)
  - Two camps of thinking
- Scalability / Interoperability / Standardization
  - Multiple codes, platform, uses
- Market Forces
  - Market disruptor

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The Types of Blockchains

1. Permissionless, Public Shared Systems
   - Bitcoin/Ethereum
2. Federated/Consortium Blockchains
   - Project Jasper – Project involving Payments Canada, the Bank of Canada, TMX Group, Accenture and R3 to evaluate blockchain solutions for the Large Value Transfer System (funds settlement) and CDSX (securities settlement)
3. Permissioned, Private Shared Systems
   - Private Company systems

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Uses of Blockchain Technology

- "Smart Contracts"
  - Intersection of law/coding
  - Self-executing, self-enforcing, pre-defined conditions
  - "If then then that"
  - Enforceability? Jurisdiction? Liability? Dispute resolution?
- Digital Identity
  - Self-Sovereign identity (single, secure, portable and immutable identity record not dependent on any centralized authority)
  - Limit access to information, as determined by individual
  - ID2020
- Origination / Supply Chain
  - Where something came from and where it has been
  - Title, receipt, authenticity etc. IoT.
- Insurance Products
  - Accelerate claims settlement, reduce fraud and abuse
- Reward Programs
  - Receive and redeem in real time, reduce fraud and abuse
- Creation of Cryptocurrency
  - More in a few moments.

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Popularity of Blockchain

- Overhyped? Of 1,053 senior executives in seven countries at companies with more than $500M in annual revenue, nearly 39% said they believe blockchain is overhyped.
- At the same time, 69% of respondents reported that their organization was spending at least $1M on blockchain technology in the next calendar year.

Source: Breaking Blockchain Open: Deloitte's 2018 Global Blockchain Survey

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Blockchain is not Cryptocurrency – but "Bitcoin" is Both

Bitcoin is **two** things:

1. The protocol/blockchain/ledger (open source code)

2. The coin (code that represents ownership of a digital "thing")

In November 2008, a paper was posted online entitled:
Bitcoin: A Peer-to-Peer Electronic Cash System

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Cryptocurrency

What is it? What it isn’t.

What is Cryptocurrency?

- Cryptocurrencies are “things” or “digital assets” built on blockchain technology, but are they:
  - Money?
    - It’s **not** money per the *Currency Act* because it is not fiat currency.
  - A commodity/good?
    - GST/HST on each transaction? Consumer protection laws.
  - A security / investment contract?
    - The Howey Test
  - Property?
    - Can you take a security interest in Bitcoin?

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Regulations/Regulators

- Securities Commissions – Regulates securities/capital markets
- Canada Revenue Agency – Administers tax laws
- Bank of Canada – Regulates monetary policy, the Canadian financial system, currency and funds management
- Financial Transactions and Reports Analysis Centre of Canada (FINTRAC) – Regulates money laundering and the financing of terrorist activities
- Competition Bureau – Protects and Promotes competition

The Regulatory Gap

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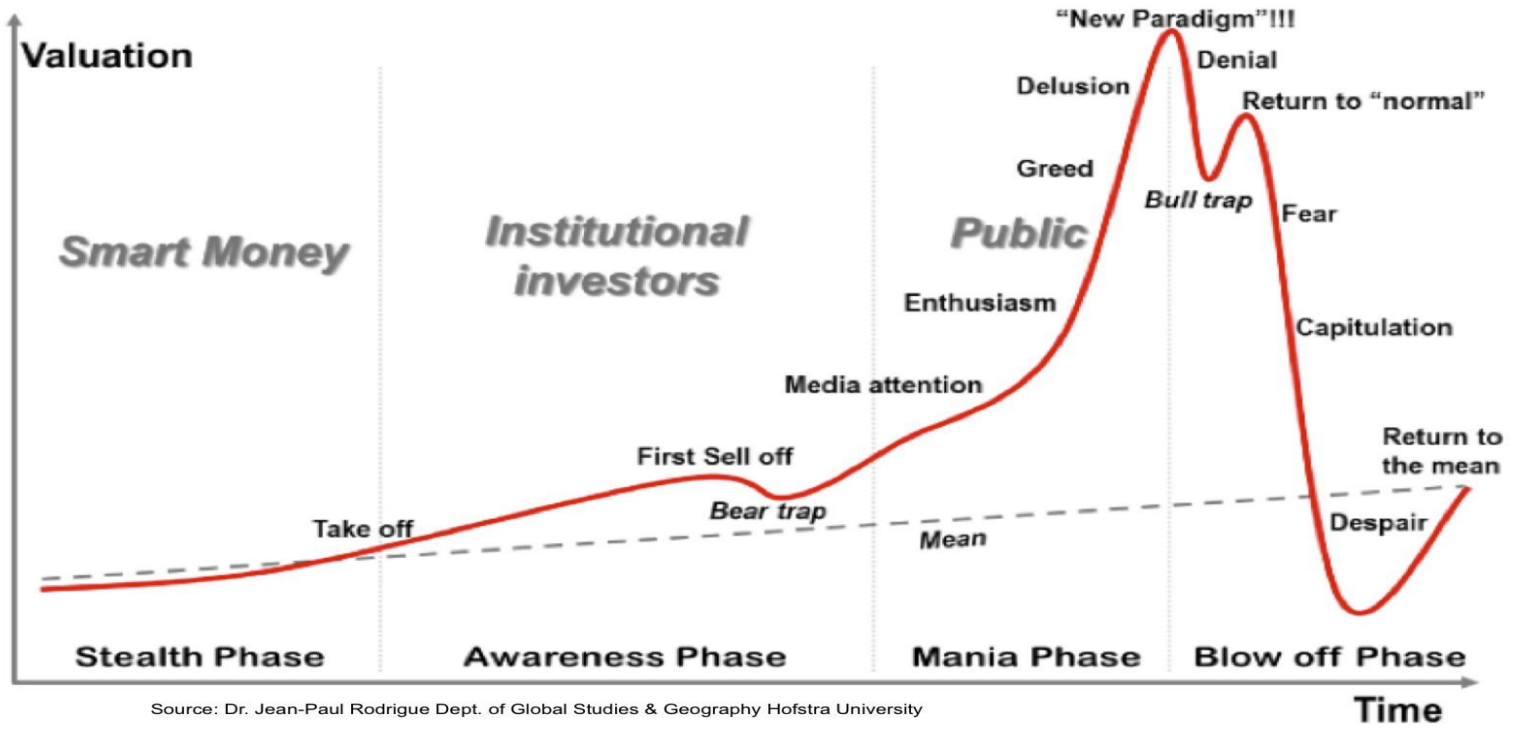
Value?



Source: Dr. Jean-Paul Rodrigue Dept. of Global Studies & Geography Hofstra University

- Price of Bitcoin November 25, 2013 - US$958.37
- Price of Bitcoin December 11, 2017 – US$17,060.55
- Price of Bitcoin April 25, 2019 – US$5,450.00

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Initial Public Offering ("IPO") vs. Initial Coin Offering ("ICO")

- Process of Sale
  - IPO: Prospectus, registered dealers, regulated exchange listing
  - ICO: Private transaction, no registered dealers, unregulated exchanges
- No traditional ownership
  - IPO: ownership in company/business/issuer, prescribed rights
  - ICO: Digital asset

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Why is it important to lawyers?

Practical Implications

How does Blockchain impact me?

- Unique Litigation
  - Multiple jurisdictions
- Lawyers as coders?
  - Where does liability rest? Core developers? Software developers? Miners? Users?
- Due Diligence
  - Code, privacy, cybersecurity, etc.

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Glossary of terms

Node – User on a blockchain.

Miner – Node who willingly contributes its computing network/resources to store and validate transactions for a fee (usual in the form of the underlying cryptocurrency).

Public Key – A larger numerical value used to encrypt data placed in an open access directory for decryption.

Private Key – Tied to public key, code paired with a public key and used to decrypt and transform a message into readable format.

Token – Cryptocurrency built on top of an existing blockchain. Not native to the particular blockchain. Gives the holder a right to participate in a particular project.

Coin – Digital equivalent of money with similar characteristics: fungible, divisible, acceptable, portable, limited supply. Not intended to perform any function beyond acting as money. Native to the blockchain that created them. e.g. Bitcoin

ICO/ITO – Initial Coin Offering / Initial Token Offering

Hash(ing) – Process of taking an input and turning it into a cryptographic output (a number) through a mathematical algorithm.

Encryption – The process of encoding a message or information in such a way that only authorized parties can access it and those who are not authorized cannot

Proof of Work – Consensus algorithm to confirm transactions which requires miners to prove they did work to add blocks to the chain. Miners compete to complete transactions on the network (high energy use)

Proof of Stake – Consensus algorithm allocating responsibility of maintaining ledger to those nodes with the largest proposition of virtual currency attached to that blockchain.

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Recommended Resources

Blockchain at Berkley

https://drive.google.com/drive/folders/0B7TsBdkClBm1c3lzaHBneEt1dU0

Lisk.io

Access the power of Blockchain

Canadian Securities Administrators

CSA Staff Notice 46-307: Cryptocurrency Offerings, 2017
CSA Staff Notice 46-308: Securities Laws Implications for Offerings of Tokens, 2018
Consultation Paper 21-402: Proposed Framework for Crypto-Asset Trading Platforms

FINTRAC

Interpretation Notices and Policy Interpretations
Compilation of FINTRAC Policy Positions, Outlier Solutions Inc.

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Recommended Resources

Canada Revenue Agency

Guide for Cryptocurrency Users and Tax Professionals
In-Depth Cryptocurrency Audit Questions

Bank of Canada

Central Bank Digital Currency: Motivations and Implications

Standing Committee on Banking, Trade and Commerce

Digital Currency: You Can't Flip this Coin!

University of Cambridge

Global Cryptocurrency Benchmarking Study, 2017

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