# Blockchain – Are You Ready For What The Future Holds?

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# About me

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- Assistant Professor, Lehman College, City University of New York
- Board of Advisors – Wall Street Blockchain Alliance (WSBA)
- Advisory Board – Gilded “Crypto Accounting Made Simple”
- E.C. Harwood Fellow – American Institute of Economic Research
- Authored and presented 2 Blockchain courses with AICPA

# But first

Before diving into any of those industry topics and applications, we need to make sure we are all on the same page regarding the technical basics of blockchain

1) Different models of blockchain

2) Some technical specifications

3) Connecting it to cryptocurrency and other IT issues

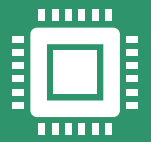
# Breaking down blockchain

- Differentiating blockchain from bitcoin
- How is blockchain different from databases
- Features and benefits for industry and government
- Private versus public
- Smart contracts
- Current market applications

# Blockchain vs. Bitcoin

Blockchain does NOT equal bitcoin, or any other type of cryptocurrency

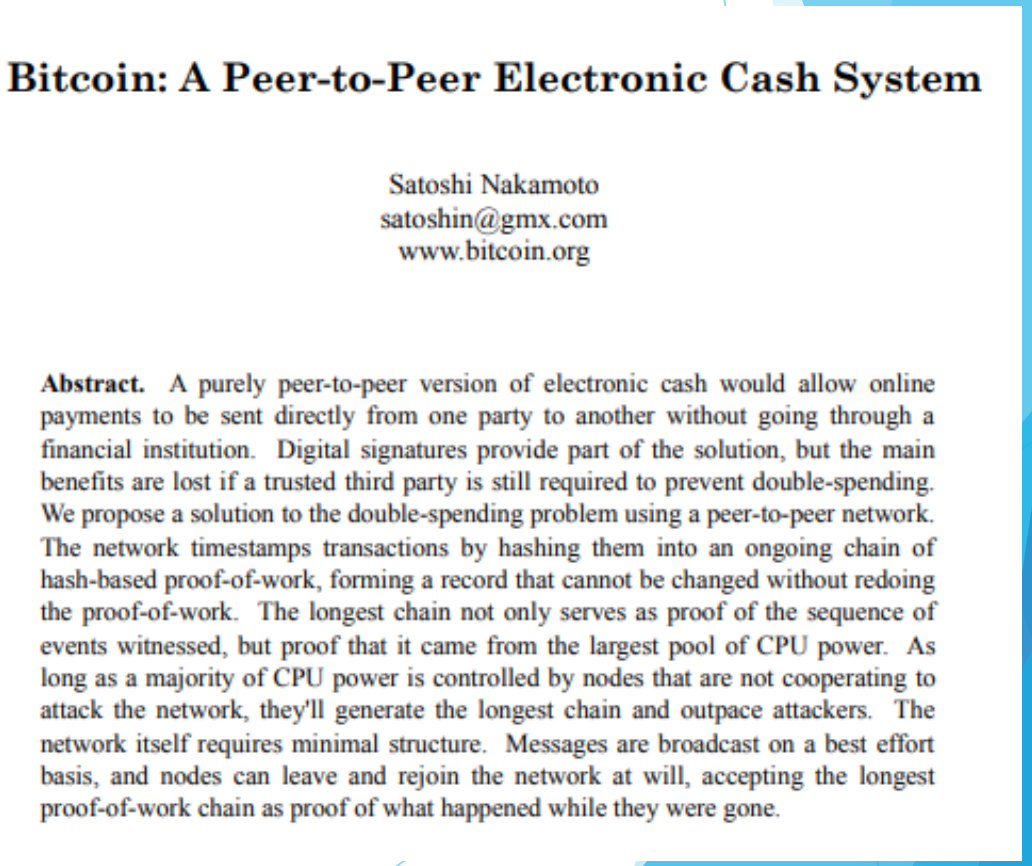
Without blockchain, bitcoin and the entire cryptoasset market would not exist



This technology had to be finalized before bitcoin or anything else could be developed

# Blockchain

- First things first, who is to blame/give credit to for all of this?
- Satoshi Nakamoto
- https://bitcoin.org/bitcoin.pdf
- 10 pages (easy read)



**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 proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

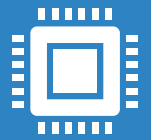
# Blockchain, cont.

Blockchain is the underlying technology platform that enables bitcoin to work

Think of it like the internet, which has different applications (like websites) that run on top of it

Internet > Cloud computing > Blockchain > Crypto

# What problem blockchain solves



Blockchain solves a very fundamental problem with organizations operating on the internet do business

The ability to make copies and distribute these copies is fantastic, but not for financial assets

We can’t simply photocopy physical money (or shouldn’t)

# Where blockchain fits

## Centralized database

- Current applications
- SAP, Quickbooks, etc

## Distributed database

- Wikipedia
- Microsoft 365

## Blockchain

- IBM Hyperledger

# Blockchain differentiation

1) Consensus

2) Real time updates

3) No single point of failure

4) Standardizes different forms of information

5) Encryption/hashing

# Public blockchain

- A decentralized and distributed ledger of encrypted information
- Comprised of nodes (network members)
  - Not every node is a full node
  - Think of it like “read” or “read/edit” ability
- Usually uses the Proof of Work consensus methodology
  - A race to complete a puzzle
  - To earn coins or other rewards
- Most secure but also most complex

# Business applications

Not terribly realistic to use for business

1) Consumers too much power

2) Technical complexity

3) Easier ways to establish and maintain other models of blockchain

# Private blockchains

- A hybrid approach between current database or ERP solutions and a public blockchain
- Usually managed by one firm, called the “organizing” firm
- Can use other types of consensus methodologies
  - Proof of Stake
  - Proof of Elapsed Time
- May not be as secure, but less energy intensive to operate

- Initial place where enterprise applications began

# Business applications

This is where the development of enterprise or corporate blockchains start being implemented and developed

1) Simpler to control

2) Less power and energy intensive

3) Easier to establish access and control issues

# Public-permissioned

- A crossover between fully public and fully private blockchains
- Allows almost anyone access to read or track transactions on the chain
- Requires special permissions or access to edit or add data to the platform
- Think of this like Google
  - Anyone can search
  - But in order to make changes or add to the results there are extra steps required
- Potential for NFP or governmental applications

# Business applications

This might ultimately be the ultimate end result for governmental blockchains

1) Freedom of information act and other disclosure legislation

2) Need for transparency

3) Connects back to the benefits of blockchain

- Efficiency
- Transparency
- Cost savings

# Consortium

- Arguably the most popular blockchain format currently in the marketplace
- Think of it like a joint venture that is co-managed and co-funded by the founding or largest members of the network
- Implemented by the Big 4 and other industry specific groups
- Allows the spreading of risk, cost, and liability between the network participants

# Business applications

Might be the ultimate evolution and development of the numerous private blockchains

1) Development of sector specific models

2) Already underway with the rollout underway via

IBM
Microsoft
JP Morgan

Assist with standardization and regulatory development

# What are firms using blockchain for?

- Cryptocurrency has received a lot of attention since 2016
- For good reason
- Lots of questions and uncertainty with regards to
- 1) Custody
- 2) Reporting
- 3) Valuation
- 4) Usage
- 5) Compliance

# Crypto is just one piece

It’s a big piece of the current blockchain conversation, but just one piece

We are going to be looking at some of the operational use cases and applications

# What problem does blockchain solve?

Let's think back to the problems that blockchain can solve

1) Lots of counterparties

2) Many different systems and options

3) Compliance issues

4) Latency

5) Reporting

Problem of trust

# Problem of Trust

- Trust is a major issue in
- 1) Supply chain
- 2) Logistics
- 3) Governmental reporting and compliance
- 4) Traceability
- 5) Cross border transactions

# Data integrity with blockchain

- Blockchain addresses this issue with the technology that lies at the core of platform
- 1) Encryption
- 2) Public/private key
- 3) Hash ID’s
- 4) Tamper-resistant
- 5) Consensus based methodology

# Emerging Topics

Some of the hot button issues in the space include, but are not limited to, the following

1) Accounting and Legal Considerations

2) Stablecoins

3) Smart Contracts

4) Regulation

# Key Takeaways

Accounting practitioners obviously have a lot of question about service offerings in blockchain and crypto

Legal considerations form the underpinning for these services

Custody, and proving custody, are absolutely essential for

| Reporting | Valuation | Attestation | Offering advisory services |
|---|---|---|---|

# Stablecoins


- What is a stablecoin?
- A cryptocurrency that is tethered, or anchored by some sort of underlying asset
  - 1) Fiat currency
  - 2) Commodity
  - 3) Other cryptocurrency that serves as a “reserve” currency

# Stablecoin issues?

- How are these coins audited?
- What collateral is used to ensure price stability?
- How are these coins stabilized?
- Does it work?

# Stablecoin Examples

- Stellar
- Gemini Dollar
- Paxos
- Tether
- True USD
- USD Coin
- DAI
- Billions in market capitalization

# Internal Controls

Internal controls are another critically important issue

QuadrigaCX led to hundreds of millions in frozen assets and losses

Just under $200 million USD

Lack of internal controls

Transfers made without client knowledge
Entire business run from single laptop
Incomplete or non-existent record keeping

Must be addressed to avoid “black box” situations

# Smart contracts

- Neither “smart” nor an actual contract
  - Just lines of executable computer code
- Examples
- AXA for travel insurance
- Etherparty creating over 500 templates for smart contacts to be used
- Some stablecoins are stabilized with smart contracts
- Kleinwork Hambros, launched a blockchain derived exchange-traded note
- Can form the basis for pledging or lending crypto and stablecoins

# Regulations

Regulations continue to focus on a few core areas, both in the United States and abroad

Wyoming

New Hampshire

Ohio

Vermont

Many others

# Regulations, cont.

| | |
|---|---|
| Provenance | How to prove who controls/owns the coins? |
| Custody | How is custody determined/proven? |
| Use for commercial purposes | Tax and operational |
| Income regulation | Mining, price changes |
| Reporting and disclosure | |

# Core emerging issues

At the heart of the issue are the following

1) What are the legal rights of crypto holders?

2) Do these legal rights differ for different coins/tokens?

3) How will the legal rights impact accounting and reporting?

4) Will stablecoins differ from other cryptoassets?

5) Is a patchwork of legal regulations emerging?

# Blockchain iterations

- Blockchain is spoken about constantly
  - And has been since 2016
- Accounting
- Finance
- Legal
- Regulatory
- Every angle possible

# Technical refresh

- Always a good idea for a technical refresh and update before diving into accounting specific issues and considerations
- 1) Blockchain is decentralized
- 2) Blockchain is distributed
- 3) Blockchain CAN be hacked and is vulnerable to cybersecurity issues and considerations

# Recent hacks include

- 1) QuadrgiaCX
  - $200 million in frozen and inaccessible assets
- 2) Bitfinex
  - Under investigation by NY Prosecutor for potential $600-850 million fraud due to lack of controls and internal controls
- 3) Binance
  - Hot wallets were hacked and breached
  - Loss of over $40 million and freeze on trades for a wee

# Current news (May 7, 2019)

# The details

Hackers stole more than 7,000 bitcoin from crypto exchange Binance, the world's largest by volume, the startup reported Tuesday.

Binance announced that a "large scale security breach" was discovered earlier on May 7, finding that malicious actors were able to access user API keys, two-factor authentication codes and "potentially other info," the exchange's CEO, Changpeng Zhao, said in a letter. As a result, they were able to withdraw roughly $41 million in bitcoin from the exchange, according to a transaction published in the security notice.

The disclosure comes hours after Zhao tweeted that the exchange was undertaking "some unscheduled server maintenance," writing that "funds are #safu." After the disclosure announcement, Zhao tweeted that the exchange would "provide a more detailed update shortly."

The exchange may not yet have identified all impacted accounts, he said. And according to Binance's statement, the breach only impacted Binance's hot wallet, which contains roughly 2 percent of the exchange's total bitcoin holdings.

# Issues

- Breach was not related to blockchain technology itself
- Focused on hot wallets
  - Less secure and online access only
- Used fake accounts to withdraw funds simultaneously
- 7,000 Bitcoins were stolen

# Breaking news

Search

Bloomberg

Cryptocurrencies

## Crypto Market Roiled by New Al Against Tether, Bitfinex

By Erik Larson, Matthew Leising, and Olga Kharif

April 25, 2019, 5:48 PM EDT *Updated on April 26, 2019, 1:38 AM EDT*

- Bitcoin drops as case alleges that Tether's cash was misused
- Defendants allegedly obscured their loss of money last year

# The issue

One of the world's most widely traded virtual currencies faces renewed doubts about its stability, after New York's top cop accused the coin's issuer of participating in a cover-up to hide the loss of about $850 million in client and corporate funds.

The allegations against Tether and the operator of cryptocurrency exchange Bitfinex, announced by the New York attorney general on Thursday, have revived doubts about Tether's claim that each of its so-called stablecoins is backed by $1 of assets -- a feature that gives the coins a central role in crypto markets around the world.

# Coverup?

**Alleged Cover-Up**

To prop up Bitfinex after the loss, the executives transferred $625 million "out of Tether's legitimate bank account" in November 2018, the case alleges, without naming that bank. In return, Bitfinex "credited" $625 million to Tether's accounts with Crypto Capital.

"That 'credit' was illusory," the attorney general wrote, because Bitfinex knew that Crypto Capital was refusing or unable to process withdrawals or return funds. In effect, executives "fraudulently shifted most or all of Bitfinex's risk of loss of several hundred million dollars onto Tether's balance sheet, but continued to represent to the market that Tethers were fully 'backed' by U.S. dollars sitting safely in a bank account. They were not."

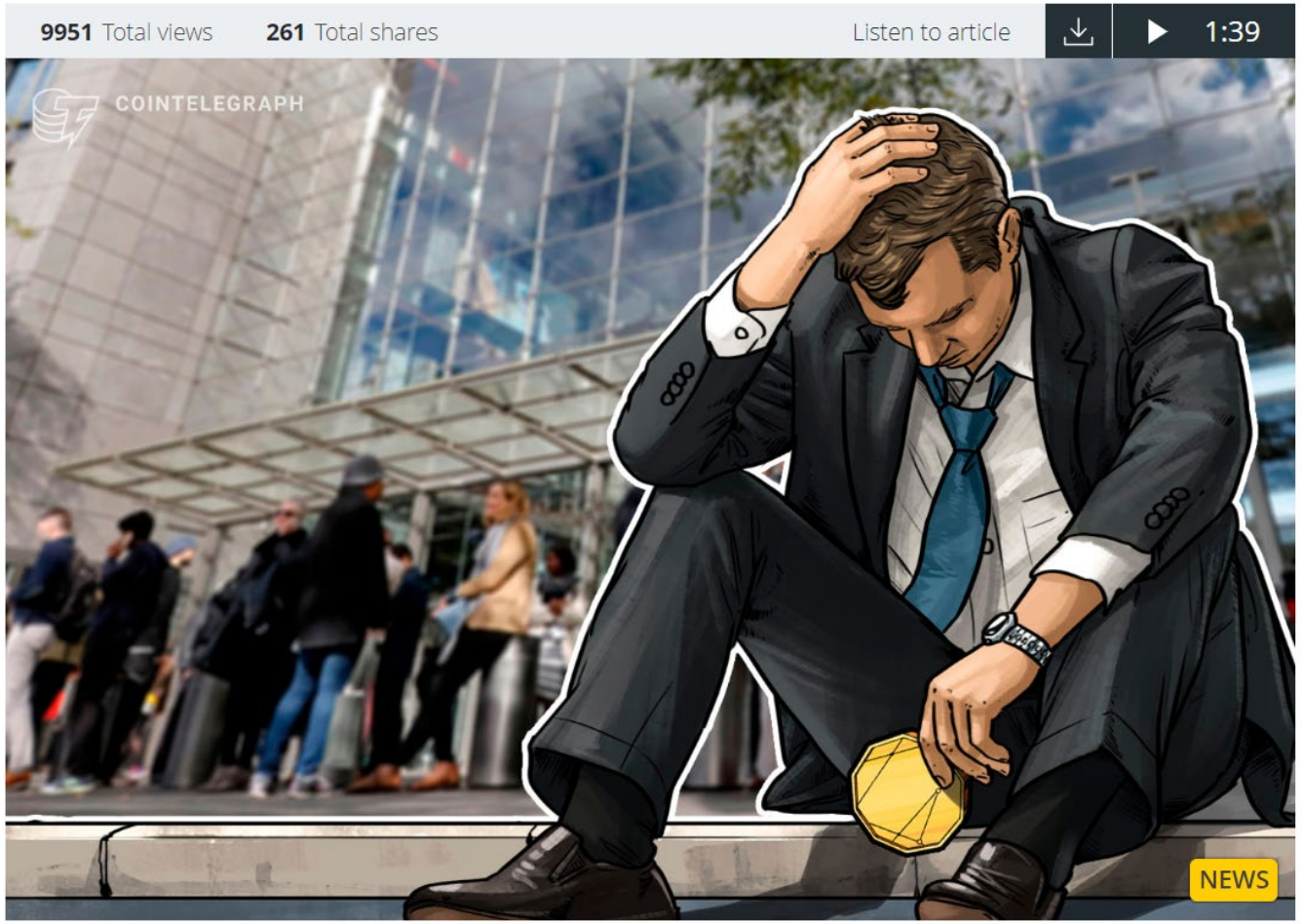
# Issues

- Lack of understanding as to how the cryptocurrency market functions
- Opacity as to the flow of funds between different parts of the cryptocurrency marketplace
- No audited financial statements
- Regulatory uncertainty for banks and other financial institutions

- Not the first, or las time

# Quadriga

## Canadian Crypto Exchange QuadrigaCX Officially Declared Bankrupt



# The issue

The untimely death of QuadrigaCX CEO Gerald Cotten has left $190 million worth of customers' crypto funds inaccessible. Many theorized that Cotten faked his demise to disappear with the money. But according to his former friend and colleague, the late entrepreneur was not capable of taking such drastic measures.

Adam O'Brien told Global News that before his death, Cotten had mused him about being kidnapped for having access to a multimillion-dollar fortune. The Edmonton-based bitcoin entrepreneur claimed that Cotten was expecting troubles from every corner – that he was assuming that "something might happen."

"Gerry was holding, we know, over $100 million, almost $200 million in funds," O'Brien asserted. "That makes people do some pretty crazy things. And I think Gerry was aware of that."

# The takeaways

- Limited internal controls
- Narrow access to funds
- No way to transfer control and custody of information in the case of CEO's death or other incident
- Not about blockchain, about accounting controls

# Government Applications

# Government Applications

- Governmental applications have, to date, been centered on improving
- 1) Efficiency
- 2) Cost
- 3) Analytics and Reporting
- 4) Regulatory consistency
- 5) Standards and frameworks

- Let’s drill down to some examples

# U.S. Federal Government

- Blockchain spending is expected to increase by 1,000% between 2017 and 2022
- Focused on government procurement and improving transparency
- IDC Government Insights projects that blockchain spending by U.S. Federal branch will increase to nearly $10 billion by 2021
- https://cointelegraph.com/news/us-govt-blockchain-spending-expected-to-increase-1-000-between-2017-2022-study

# Wyoming

- Spearheaded by the Wyoming Blockchain Coalition
  - Caitlin Long
- Passed 12 laws at the state level to clarify
- 1) Custody
- 2) Ownership
- 3) Reporting
- 4) Classification
- 5) Legal status
- https://www.forbes.com/sites/caitlinlong/2019/03/04/what-do-wyomings-new-blockchain-laws-mean/#53054a945fde

# Vermont

- In January of 2019, Vermont launched a program to begin integrating blockchain into insurance applications and payouts
- Focused initially on captive insurers, headquartered and operating within the state itself
- Emphasis on transparent and validated record sand transactions
- https://www.coindesk.com/vermont-state-government-launching-blockchain-insurance-pilot

# International governments

- Across the globe, governments are taking three ranges of approaches to how to regulate and treat blockchain and cryptocurrencies
- 1) Tightly regulate and oversee
- 2) Wait and see approach
- 3) Pro-blockchain adoption

# China

- Example of a government that is tightly regulating blockchain and cryptocurrency
- Blockchain is being supported via public-private partnerships in regional economics hubs
- Cryptocurrency, however, is almost banned entirely
  - Trading
  - Investing
  - Mining

# Malta & Isle of Man

- Both have put themselves forward as blockchain hubs and centers of innovation for blockchain and cryptocurrency
- Creating sandboxes (light regulatory touch)
- Encourage development, innovation, and investment
- Potential replacement for private banking services that have been replaced or regulated away

# United States

- Right in the middle in terms of global regulation and treatment of blockchain/crypto space
- Federal regulation is still emerging
- States are taking the forefront
- Crypto has been the focus to date, but blockchain regulation is catching up

# Industry Examples

# Industry Applications

- Blockchain has been adopted by hundreds of organizations across industry lines
- Regardless of industry, there are several core themes:
- 1) Improved traceability
- 2) Reduced organizational friction
- 3) Increased efficiency
- 4) Lower costs
- 5) Better analytics

# Philip Morris

- Focused on stamp tracking as well as tracking down illegal sales of PM products
- Estimated savings to PM of $20 million
- Industry and government savings of $100 million
- Reduction on both paperwork latency and fraud

- https://cointelegraph.com/news/tobacco-giant-philip-morris-estimates-it-could-save-up-to-20-million-by-using-blockchain

# JP Morgan

- Launched Quorum to form the foundation for the JPM Coin implemented to facilitate commercial cross border payments among institutional clients
- Has signed up 220 other banks for the Interbank Information Network (IIN) as of Q1 2019
- Main benefit is to reduce time and complexity associated with interbank payments
- https://cointelegraph.com/news/jpmorgan-continues-to-explore-blockchain-for-cross-border-payments-having-signed-220-banks-worldwide-along-the-way

# Rotterdam

- Largest port in Europe
- 3rd largest port in the world by volume of cargo shipped though it on an annual basis
- Blockchain applications focusing on two separate systems
- 1) Coordinating logistics and shipments of cargo
- 2) Decentralizing and improving efficiency of electrical grid
- https://www.portofrotterdam.com/en/our-port/facts-figures-about-the-port
- https://www.the-blockchain.com/2019/04/28/port-of-rotterdam-bullish-on-blockchain-powering-forward-with-new-projects/

# European Union

- In April of 2019, the EU launched the International Blockchain Association
- Coordination with leading firms and organizations to assist with:
- 1) Standardization
- 2) Interoperability
- 3) Regulation
- 4) Convergence of standards
- 5) Develop sector specific guidelines
- https://cointelegraph.com/news/eu-launches-international-blockchain-association-bringing-crypto-one-step-closer-to-mainstream-adoption

# EY Blockchain Analyzer

- Second iteration of the EY Blockchain Analyzer tool was launched in 2019 at the second Global Blockchain Summit
- Accesses numerous types of blockchains and cryptoassets
- Focus on audit and assurance clients at first
- Expanding into non-assurance clients and services as well
- https://www.ey.com/en_gl/news/2019/04/multimillion-dollar-investment-in-ey-blockchain-analyzer-delivers-new-upgrades-for-blockchain-and-cryptocurrency-audit-and-tax-services

# Volkswagen

- Has partnered with IBM to implement blockchain to better track supplies
- Cobalt, 2/3 of supply comes from the Democratic Republic of the Congo
  - Potential for human rights abuses
- Seeks to improve transparency and traceability into cobalt and other supply chain issues
- https://cointelegraph.com/news/volkswagen-joins-ibm-backed-blockchain-platform-for-cobalt-supply-chains

# IBM World Wire

- Developed in coordination with Stellar to develop a more efficient way to conduct and settle cross border payments
- Reduce the time required to settle transactions to seconds from days
- 72 countries
- 47 currencies
- 1081 unique currency trading pairs
- https://www.ibm.com/blockchain/solutions/world-wire

# DTCC

- Depository Trust and Clearing Corporation (DTCC)
- What is that?
- Handles the custody, clearing, and settling for 1.85 quadrillion transactions every year
- Planning on moving a $10 trillion a year credit derivative operations onto a customized blockchain
- https://www.forbes.com/companies/depository-trust-clearing/?list=blockchain50/#606908225dd6

# Forbes Top 50 Organizations

- “Blockchain Goes To Work”
- https://www.forbes.com/sites/michaeldelcastillo/2019/04/16/blockchain-goes-to-work/#1ebe2b0a2a40
- Includes Amazon, Cargill, JP Morgan, Allianz, AB InBev, BP, Citigroup, Coinbase, CVS

# Thank you!