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TRANSFORMING...  
**OURSELVES.**  
**OUR WORKPLACE.**  
**OUR PROFESSION.**

# BLOCKCHAIN TECHNOLOGY

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# AGENDA

Topic
Origins
Fundamentals
Utility
Outlook
Resources

# OBJECTIVES

- By the end of this course, you will be able to:
  - Gain a fundamental understanding of blockchain technology
  - Understand the risks associated with blockchain technology
  - Learn what the key advantages of blockchain technology are

## ORIGINS

- Bitcoin was founded by Satoshi Nakamoto
  - Anonymous person or group
  - Released whitepaper *Bitcoin: A Peer-to-Peer Electronic Cash System* in October 2008
    - <https://bitcoin.org/en/bitcoin-paper>
  - Released open-source bitcoin software in January 2009
- Response to financial crisis and centralization of monetary system
- Silk Road and other dark markets were early drivers of usage

# ORIGINS

- Bitcoin is based on open-source software
  - Anyone can review and provide suggestions for the source code
  - Capped at 21 million units
  - Supported by cryptography
  - Miners find new bitcoin blocks
- Solved the “double-spend” problem
  - Cannot spend the same bitcoin over multiple transactions
  - Each bitcoin is unique

# FUNDAMENTALS

- Bitcoin is Digital/Virtual
  - Electronic cash
  - Cryptocurrency
  - Highly divisible
- Decentralized
  - Control is in the hands of the user base
  - No single authority in place (e.g. Federal Reserve)
  - Shut down is highly improbable and difficult

# FUNDAMENTALS

- Bitcoin is stored via digital wallets
  - Online wallets (exchanges)
    - Coinbase, Kraken, Bitfinex, Mt. Gox
  - Desktop wallets
    - Bitcoin Core, Armory, Electrum
  - Mobile wallets
    - Mycelium, Xapo
  - Hardware wallets
    - Trezor, Nano Ledger
  - Paper wallets via QR codes



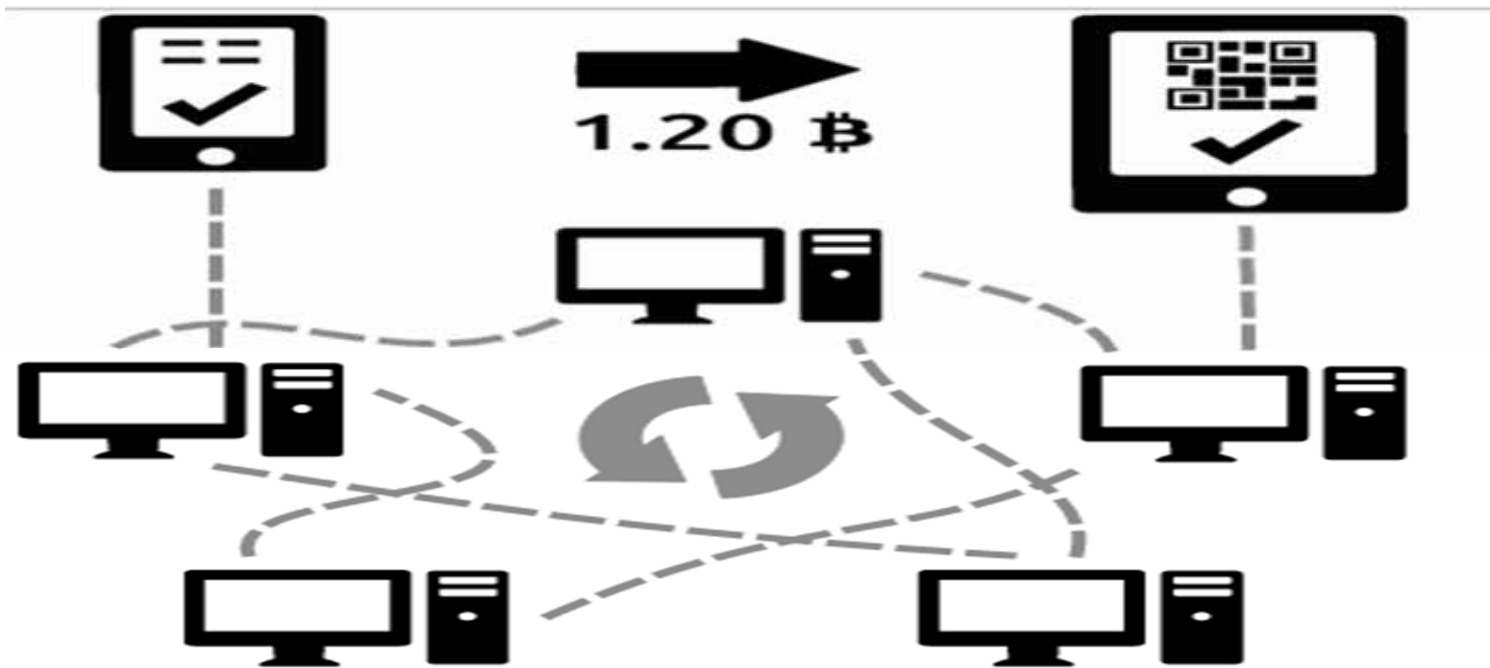
# FUNDAMENTALS

- Barrier for entry is low
  - Any with a smartphone can use bitcoin
  - Borderless and stateless
- Transactions are fast and immediate
  - Sending/Receiving bitcoin is as fast as sending an email
  - Funds are available within seconds
- Transaction fees are low
  - Fees for using bitcoin are substantially lower than traditional financial players (e.g. Visa, Western Union)
  - Ability to move large amounts of money cost-effectively

# FUNDAMENTALS

- Risks for the user
  - Cryptocurrencies are not protected in the same manner that traditional bank accounts are (e.g. FDIC, fraud protection)
  - While some exchanges have added insurance in the event of a cyber incident, each exchange will likely differ depending on location (e.g. US, China, decentralized)
  - If you lose your private keys, you lose your cryptocurrencies
    - Desktop wallet gets deleted
    - Paper wallet gets destroyed
    - Hardware wallet is lost
  - Hackers have devised malware that can steal cryptocurrencies from digital wallets

# FUNDAMENTALS



# FUNDAMENTALS



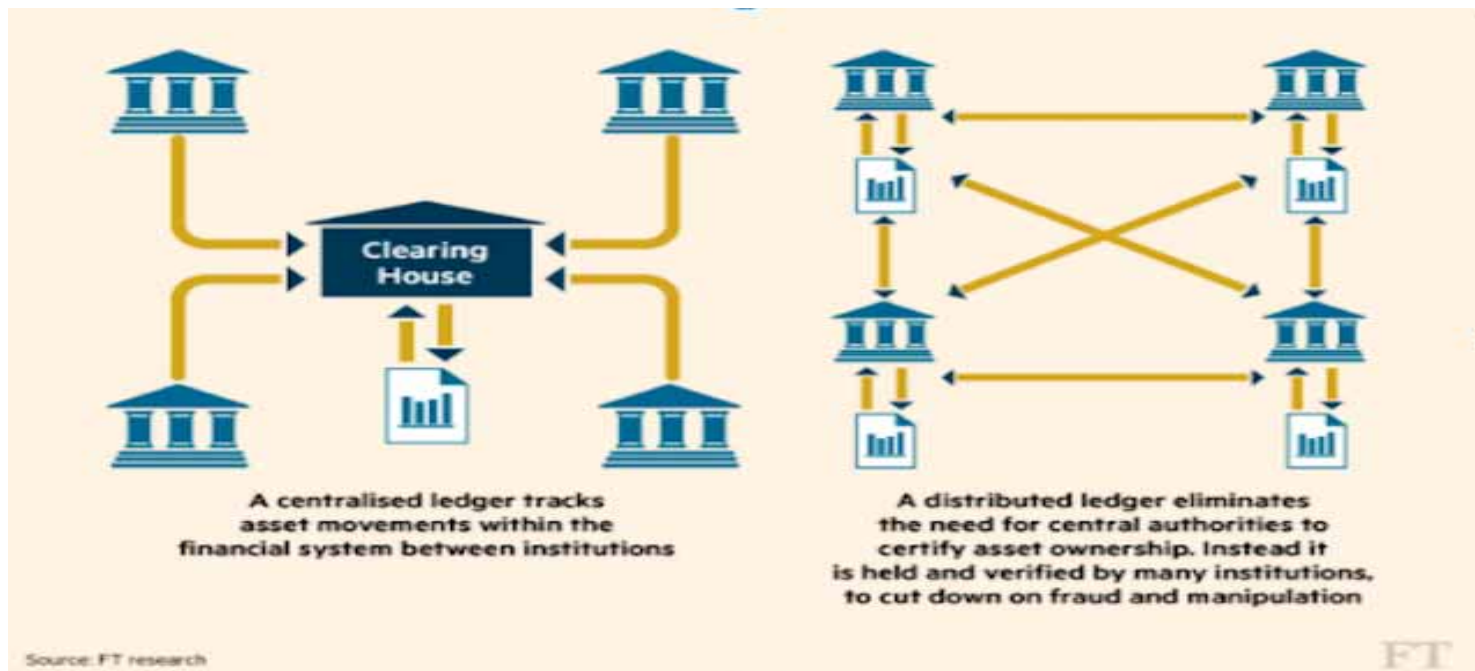
## UTILITY

- Large firms have begun accepting bitcoin in various capacities
  - Microsoft, Dell, Overstock, United Way, Expedia, PayPal, DISH Network, WordPress
  - Often use a third-party company to convert bitcoin to USD to avoid price fluctuations
- Bitcoin ATMs have begun to surface around the world
- Financial products are being created for traditional investors

## UTILITY

- A blockchain is a distributed ledger that serves as a transaction database
  - Records all transactions made
  - Relies on consensus of participants instead of a central authority for validation of transactions
  - Transactions are irreversible
  - Bitcoin's blockchain is used primarily as a payment network

# UTILITY



# UTILITY

- Permissionless vs permissioned blockchains
  - Similar to internet vs. intranet
- Permissionless blockchain (public)
  - Can be used by anyone without prior approval
  - Control is decentralized
  - Bitcoin, Ethereum, Litecoin
- Permissioned blockchain (private)
  - Can only be used by trusted parties
  - Control is centralized
  - R3 startup



# UTILITY

- Ethereum
  - Currently second largest cryptocurrency
  - Driven by usage of smart contracts that can support decentralized applications
  - Has resulted in several innovative projects through the use of ERC-20 tokens (e.g. Status, Augur)
  - Applications go beyond that of financial use cases

# UTILITY



1



An option contract between parties is written as code into the blockchain. The individuals involved are anonymous, but the contract is the public ledger.

2



A triggering event like an expiration date and strike price is hit and the contract executes itself according to the coded terms.

3



Regulators can use the blockchain to understand the activity in the market while maintaining the privacy of individual actors' positions

## UTILITY

- The Distributed Autonomous Organization (DAO) incident
  - Built on top of Ethereum's blockchain
  - Largest crowdfunding event in history at the time, raised over \$150 million from more than 11,000 users
  - Hacker exposed flaw and stole funds
  - The DAO contained 15% of all ether in circulation
  - "Too big to fail" decision for Ethereum community

# OUTLOOK

- Venture Capital Funding
  - Over \$1 billion raised by blockchain startups thus far
- Hyperledger Project
  - Cross-industry effort to collaborate on blockchain technology started by Linux Foundation in 2015
  - Over 40 firms have joined the effort, such as: IBM, JP Morgan, Intel, CME Group, Hitachi, BNY Mellon
- Enterprise Ethereum Alliance
  - Connects business, technology, and academia with Ethereum experts in an effort to build enterprise level applications on top of the Ethereum blockchain
  - Members include Deloitte, Credit Suisse, and Microsoft

## OUTLOOK

- Regulation of virtual currencies and blockchain
  - April 2017: Japan recognizes bitcoin as a legal form of payment
  - Regulators in the US and globally have provided commentary, but are still putting together comprehensive guidance
  - IRS says bitcoin and other digital currencies should be treated as property for US Federal tax purposes
- Risk of over regulation or under regulation
  - Ongoing debate of how much regulation is needed to both protect consumers and promote innovation

## OUTLOOK

- Potential to provide financial services to the underbanked
  - Individuals in developing nations with limited access to traditional financial products
  - Expansion of internet availability is key (e.g. Google balloons, Facebook drones)
- Future is bright, however, much work is still required to reach potential
  - The internet took several years to become useful to the average person
  - “Killer app” is still needed

# OUTLOOK

- Disruption to Financial Services
  - Monetary policy is not determined by a central authority, but rather by user consensus
  - Cryptocurrencies are faster, cheaper, and more accessible than traditional financial offerings
  - Initial Coin Offerings (ICOs) have allowed for anyone in the world to raise large amounts of money efficiently
    - Open-source approach to venture capital
    - Ability to reach millions of investors through online engagement (e.g. social media, message boards)
    - Some ICOs have resulted in violation of laws, pump and dump schemes, and fraud

# OUTLOOK

- Disruption to Other Industries
  - Cloud storage
    - Siacoin and Filecoin are aiming to offer users decentralized cloud storage at a fraction of the price being charged by Amazon and Google
  - Computing power
    - Golem is aiming to become a global market for renting out idle computing power, similar to how Airbnb operates
  - Real Estate
    - Blockchain can streamline the legacy components of buying a home (e.g. escrow services, deeds/titles)



## RESOURCES

- Questions to ask your CIOs and CTOs
  - Can blockchain help our firm?
    - Important to determine if there will be an actual benefit and what the associated risks are
  - Do we have a blockchain strategy?
    - If it can help your firm, what is the desired outcome
  - Should the firm use a permissioned (private) or permissionless (public) blockchain?
    - Critical that a thoughtful analysis is completed
  - Are awareness/training sessions being provided to staff and management?
    - Allows for understanding of goals and future opportunities

# RESOURCES

- Bitcoin.org (<https://bitcoin.org/en/>)
- Ethereum.org (<https://www.ethereum.org/>)
- Reddit
  - <https://www.reddit.com/r/Bitcoin/>
  - <https://www.reddit.com/r/ethereum/>
- Bitcoin Wiki ([https://en.bitcoin.it/wiki/Main\\_Page](https://en.bitcoin.it/wiki/Main_Page))
  - Provides detailed information on bitcoin and blockchain
- Coindesk (<http://www.coindesk.com/>)
  - Comprehensive cryptocurrency and blockchain news site
- Coinbase (<https://www.coinbase.com/>)
  - US-based firm that offers customers the ability to buy, sell, send, and trade cryptocurrencies
- Hyperledger Project (<https://www.hyperledger.org/>)
  - Official site for the cross-industry blockchain collaboration

# QUESTIONS AND ANSWERS?

END OF PRESENTATION

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# THANK YOU FOR YOUR TIME AND ATTENTION!

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