



# BLOCKCHAIN & CRYPTOCURRENCIES

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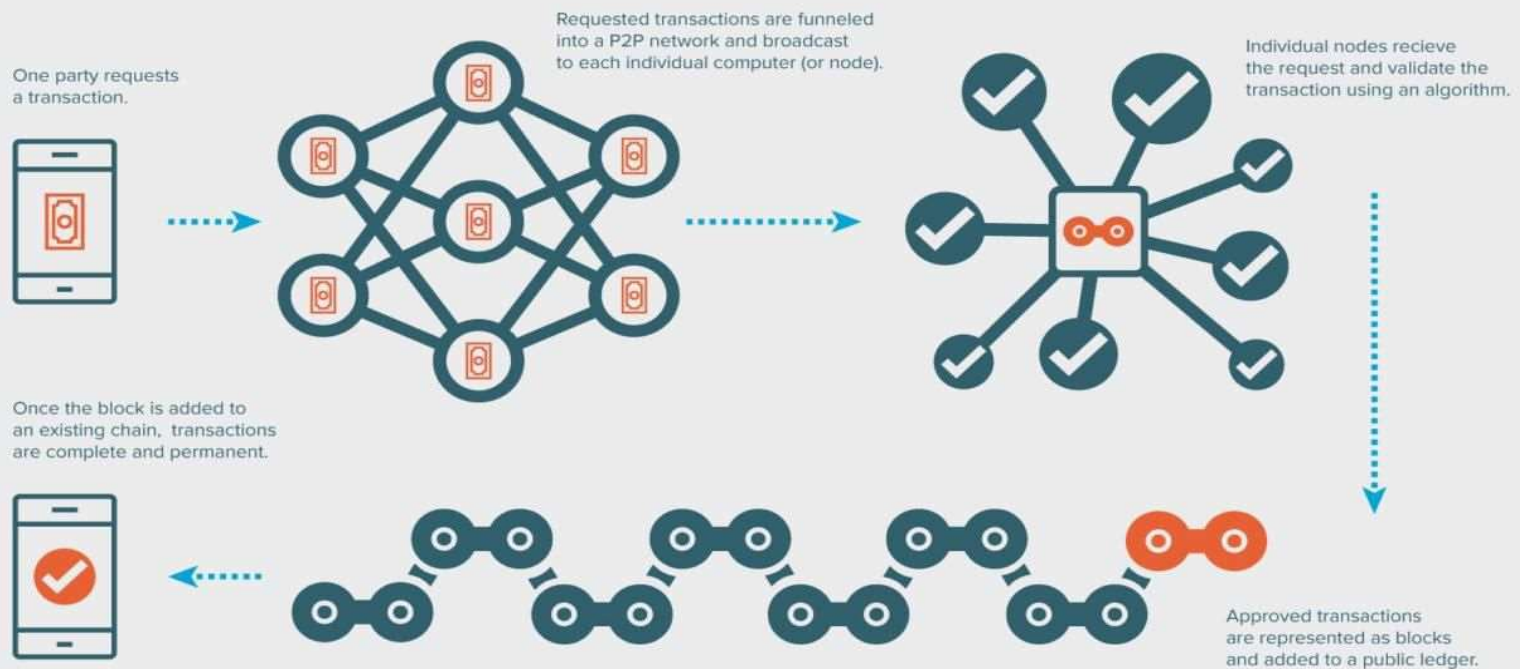
# AGENDA

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- › Blockchain Basics
- › Digital, Virtual and Cryptocurrency Summary
- › Pay Taxes with Bitcoin
- › Bonds on the Blockchain
- › Questions

# Distributed Ledger Technology

## HOW DOES BLOCKCHAIN WORK?





# Distributed Ledger Technology

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- › Distributed Ledger Technology refers to the technology infrastructure and protocols that allows simultaneous access, validation and record updating in an immutable manner across a network spread across multiple entities or locations
  - › Distributed reflects the decentralized nature, opposed to a centralized silo of database
  - › Ledger is simply a connotation for a database of records





# Distributed Ledger Technology

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- › Distributed Ledger technology can help governments in tax collection, issuance of passports, record land registries, licenses and outlay of Social Security benefits as well as voting procedures



# Blockchain Basics: What Blockchain Is

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- › Blockchain is a distributed, decentralized, public ledger
- › Blocks on the blockchain are made up of digital pieces of information, including information about transactions (e.g., date, time, dollar amount), information about who is participating in transactions, information that distinguishes them from other blocks.





# Blockchain Basics: What Blockchain Is

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- › In order for a block to be added to the blockchain, four things must occur:
  - › A transaction must occur;
  - › That transaction must be verified;
  - › That transaction must be stored in a block;
  - › That block must be given a hash (a unique, identifying code).





# Blockchain Basics: What Blockchain Is Not

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- › Blockchain is not Bitcoin; bitcoin is just one cryptocurrency application of blockchain
  
- › Blockchain technology can be used and configured for many other applications







# Blockchain Basics: What Blockchain Is Not

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- › Blockchain is not always better than traditional databases, given certain technical trade-offs and costs
- › Blockchain is particularly valuable in low-trust environments where participants cannot trade directly or lack an intermediary





# Smart Contracts

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- › Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code
  - › The code and the agreements contained therein exist across a distributed, decentralized blockchain network
- › Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system or external enforcement mechanism
  - › They render transactions traceable, transparent, and irreversible



# Digital, Virtual and Crypto Currencies

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- › Digital currencies are intangible and can only be owned and transacted in by using computers or electronic wallets which are connected to the Internet or the designated networks
- › Can be used to purchase goods, pay for services





# Digital, Virtual and Crypto Currencies

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- › Virtual currency can be defined as an electronic representation of monetary value that may be issued, managed and controlled by private issuers, developers or the founding organization.
  - › Such virtual currencies are often represented in terms of tokens and may remain unregulated without a legal tender
- › Unlike regular money, it relies on a system of trust and may not be issued by a central bank or other banking regulatory authority
  - › Thus, such virtual currencies may be prone to wide swings in their valuation





# Digital, Virtual and Crypto Currencies

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- › Cryptocurrency is a digital or virtual currency that uses various encryption algorithms and cryptographic techniques, such as private-public key pairs and hashing functions, which makes it difficult to counterfeit



# Digital, Virtual and Crypto Currencies

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- › Many cryptocurrencies are decentralized systems based on blockchain technology
- › The first blockchain-based cryptocurrency was Bitcoin, launched in 2009, which still remains the most popular and most valuable.
- › There are thousands of alternate cryptocurrencies with various functions or specifications



# Bitcoin

- › As of October 2018, there were over 17.33 million Bitcoins in circulation with a total market value of around \$115 billion
- › Bitcoin's success has spawned a number of competing cryptocurrencies, known as "altcoins" such as Litecoin, Namecoin, Peercoin, Ethereum, EOS, and Cardano
- › Today, there are thousands of cryptocurrencies in existence with an aggregate market value of over \$200 billion





# Notable Use Case: Pay Taxes with Bitcoin

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- › Ohio recently became the first state to accept bitcoin for tax bills
- › As of November 26, 2018, businesses registered in Ohio can go to the website [OhioCrypto.com](http://OhioCrypto.com) and register to pay 23 different taxes with bitcoin, everything from sales taxes to employee withholding taxes
- › Eventually, the initiative will expand to individual filers





A decorative graphic in the top left corner consisting of a network of grey dots connected by thin lines, resembling a blockchain or data network.

# Notable Use Case: Pay Taxes with Bitcoin

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- › The Ohio Treasurer's office boasts the following benefits:
  - › Real time tracking: Payments on the blockchain can be tracked on an instantaneous basis
  - › Secure payments: Cryptocurrencies cannot be transferred to third parties without user initiation
  - › Low fees: A minimal fee is charged to confirm transactions on the blockchain network
  - › Transparency: Anyone can view all transactions on the blockchain network





# Notable Use Case: Bonds on the Blockchain

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- › Issuing bonds via blockchain would disrupt the traditional process in which governmental entities sell their bonds to banks that would resell the bonds to numerous intermediaries before reaching an investor
  - › UC Berkeley Haas Institute estimates that bond issuers lose approximately \$4 billion annually as a result of this process



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# Notable Use Case: Bonds on the Blockchain

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- › With blockchain technology, all transactions would be recorded on a public digital ledger where traders could buy and sell directly and avoid brokerage markups or delays
- › All transactions would be recorded as soon as they are issued so there would be more transparency than is usually available in the traditional municipal bond market



# Notable Use Case: Bonds on the Blockchain

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- › Berkeley, California is getting ready to apply blockchain technology to public finance as a way to raise funds for city projects
- › The city would go to market with a public initial coin offering, allowing investors a chance to purchase either monetized digital tokens or municipal bonds issued in U.S. dollars
- › The City could issue micro bonds in amounts of \$10-\$25, much lower than the current minimum of \$5,000





# Notable Use Case: Bonds on the Blockchain

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- › Pilot program is raising funds for a firetruck
  - › Bigger applications in mind: affordable housing
- › Digital municipal bonds would still work like any other municipal bonds by paying out interest to investors in U.S. dollars or, if investors prefer, in Berkley's own cryptocurrency
- › Unintended Consequences?



# QUESTIONS?

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