

## **Blockchain Applications in Commercial Finance: Loan Syndications, Servicing, Swaps, Trade Finance and More**

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Today's faculty features:

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# Presenter: Steven T. Snyder



- Member of Cybersecurity and Privacy team within the Banking and Financial Services Practice Group
- Privacy Law Specialist and Fellow of Information Privacy with IAPP
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- Licensed in NY and NC

## Presenter: Jenny E. Cieplak



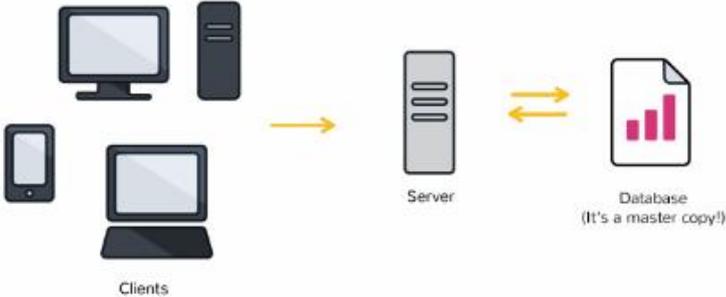
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**Jenny E. Cieplak** focuses her practice on technology transactions, in particular FinTech and the financial services industry. Her experience includes work on the creation, governance, and sale of electronic trading platforms, exchanges, swap execution facilities, clearinghouses, and data repositories. She provides her clients with a unique combination of skills based on her knowledge of technology and her experience with collaborative arrangements between IP creators and users, especially in the financial industry.

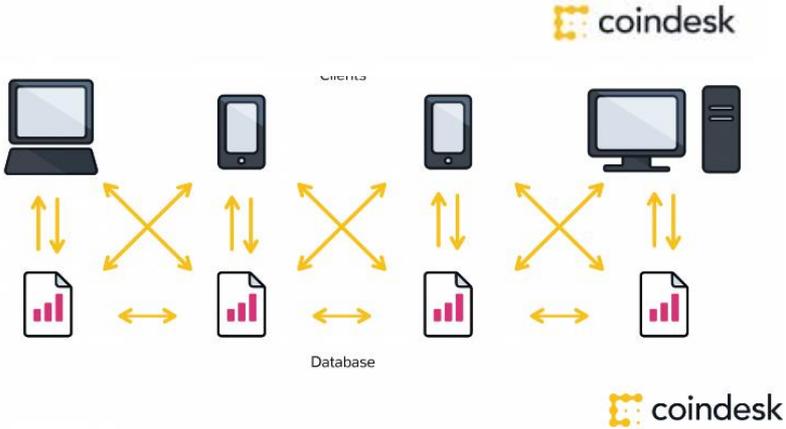
# Introduction to Digital Ledger Technology and Blockchain

# Traditional Databases and Distributed Ledger Technology

- Traditional database



- Distributed ledger technology



# What Is the Difference Between Distributed Ledger Technology and Blockchain?

## ■ **Distributed Ledger Technology (DLT)**

- A type of database that is shared, replicated and synchronized among the members of a network.

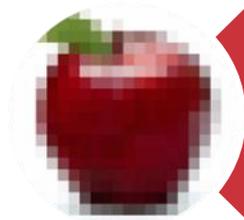
## ■ **Blockchain**

- One particular type of tamper-evident, shared digital ledger that records transactions in a public or private peer-to-peer network. (Typically associated with the technology underlying Bitcoin transactions.)

# What's the Hype About Blockchain?



Physical transfer of item = trust that the item is what someone says it is.



What if the item is only in digital form? How do I know I'm getting the only version of this specific digital apple?



This problem was solved in a clever way – creating “blockchain” technology.

# A Closer Look at Blockchain



Real-time digital record verifying the transaction and containing information about the data, time and order of the transaction.

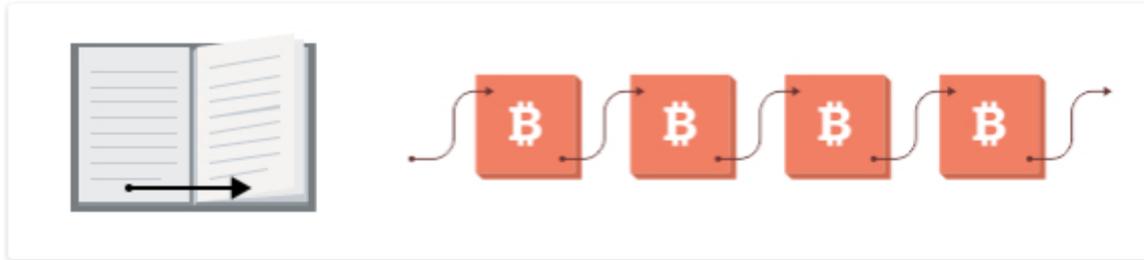


Data is time-stamped and "fingerprinted." The practical effect is that a block of data can never be altered or tampered once validated.



Uses cryptography and digital signatures to prove identity, authenticity and enforce read/write access rights.

# The Blockchain Fingerprint



*Blocks in a chain refer to previous blocks, like page numbers in a book.*

BOOK ORDERING	BLOCK ORDERING
Page 1, 2, 3, 4, 5	Block n58uf0 built on 84n855, Block 90fk5n built on n58uf0, Block 8n6d7j built on 90fk5n.
Implicit that the page builds on the page whose number is one less. eg Page 5 builds on page 4 (5 minus 1).	84n855, n58uf0, 90fk5n, 8n6d7j represent fingerprints or hashes of the blocks.

*The reference to previous blocks creates a chain of blocks – a blockchain!*

# Smart Contracts, E-Signatures and Automated Tracking and Enforcement

# Smart contracts make distributed transactions work

- Smart contracts are computer protocols incorporated into a distributed ledger that implement the terms of a negotiated contract in a self-executing manner.
- May either be written entirely in standalone computer code, coupled with traditional written agreements reflecting the same negotiated terms codified in the computer code, or partially governed by computer code and partially governed by a traditional written agreement that is incorporated by reference in the code.
- Broad applicability and may be used to govern or facilitate many types of transactions.
  - Smart contracts can take information from borrower's receivables account, use that information to adjust borrowing base, and automatically make funds available.
  - Smart contracts can automatically compress derivatives portfolios.
  - Smart contracts can put a restriction transfers of an asset (i.e., a lien) and automatically release that lien when the loan is repaid.

# Are smart contracts enforceable?

- Smart contracts and traditional contracts are fundamentally and conceptually equivalent.
- Mechanics used in smart contract transactions are simply a logical progression of business practice.
  - Transition from traditional contracts to agreements consummated by digital signatures.
  - Increased adoption of click-wrap agreements.
- Courts have readily enforced digital signatures and click-wrap agreements, and smart contracts are a natural extension.
  - Electronic Signatures in Global and National Commerce Act (the E-Sign Act).
  - Uniform Electronic Transactions Act (the UETA).

# Statutory enforcement mechanisms for smart contracts

- Digital signatures using distributed ledger/public key technology haven't been tested in court. But...
- Under the Electronic Signatures in Global and National Commerce Act (E-Sign Act) and the Uniform Electronic Transactions Act (UETA), a digital signature using public key encryption technology should qualify as an electronic signature, as would the mere inclusion of one's name as a part of an e-mail message - so long as in each case the signer executed or adopted the symbol with the intent to sign.
  - This does not mean that electronically-executed documents, including smart contracts, are automatically valid.
  - Whether a contract has actually been executed, and whether that contract is enforceable, are questions that fall outside of these statutes and are governed by common law.

# Making smart contracts practical: oracles

- To automate performance, the smart contract must have access to any metric by which performance must be measured.
- Smart contracts, like some other types of computer code, can be described as a series of “if-then” statements. To activate the process, one must know whether the condition has occurred.
- Example: if loan payments will be automated, need access to an interest rate provider.
- “Oracles” are third-party information services providers that will digitally “sign” a transaction, attesting to the occurrence of specific conditions. This doesn't make the oracle party to the transaction - the oracle is just attesting that the condition has occurred.
- The oracle's digital signature can be retained on the distributed ledger so that parties can review the payment process and confirm that payments were made correctly.

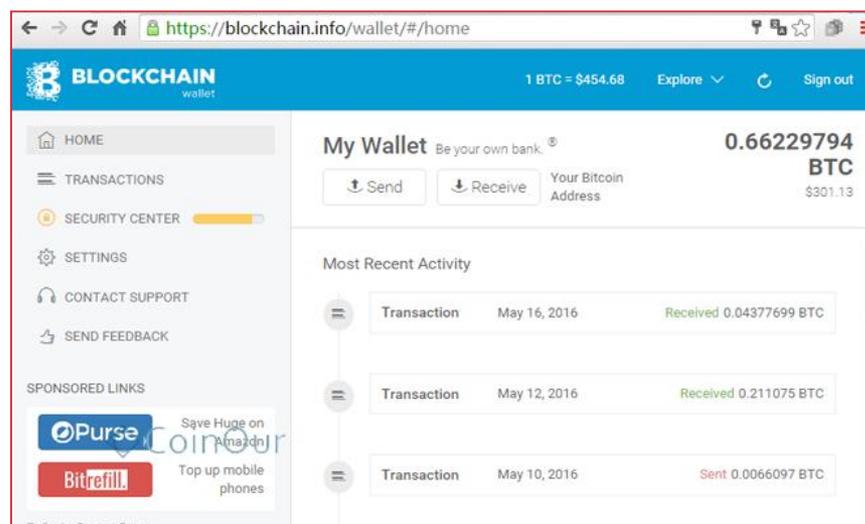
# Making smart contracts practical: means of performance

- To automate performance, the smart contract must also have access to the means of performance. In practice, this means access to funds or other assets.
- Early smart contract implementations for cryptocurrencies required parties to deposit all cryptocurrency necessary to perform the contract into a segregated account, which is impractical for commercial use.
- Distributed ledger providers are working on integration with existing payment systems and mechanisms on the ledger for payments without requiring deposits of all funds necessary to perform the contract.
- Distributed ledgers can also integrate with asset registries to impose and lift liens and even transfer assets as payments are exchanged through the ledger.

# Potential Applications for Commercial Finance

# The Potential for Blockchain

- Currently, most blockchains require the use of special coding skills and computer language (with the exception of some bitcoin wallet interfaces).
- However, companies are working on achieving mainstream adoption (i.e. DOS to Windows).



# Possible Commercial Finance Applications – Trade Finance

Technology News / Latest Technology News / Corporate

Corporate » IBM trade finance Blockchain

## IBM brings blockchain technology to resolve trade finance woes

*The blockchain-based trade finance platform aims to solve 8-9 different roles*

Sanghamitra Kar | ETtech | Updated: November 23, 2017, 15:21 IST

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American tech giant IBM is today launching a blockchain based trade finance platform that will cater to India along with South Asia region to create multi-party cross border trading networks. Essentially, a blockchain serves as an open, distributed ledger. Usually, it is managed by a peer-to-peer network collectively adhering to a protocol for

Forbes / Tech / #Economy

DEC 11, 2017 @ 11:44 AM 1,669

## Blockchain -- Biggest Trade Finance Innovation Since Cuneiform Tablets?



Tom Groenfeldt, CONTRIBUTOR

*I write about finance and technology.* FULL BIO

Opinions expressed by Forbes Contributors are their own.

Blockchain will get down to business in finance during 2018, says Grainne McNamara, PwC's financial services Blockchain Leader.

**Bradley**

# Possible Commercial Finance Applications – Trade Finance

- In September 2016, Barclays conducted the first blockchain-based trade finance deals with live customers.
- The blockchain-based transaction was a letter of credit.
- The Barclay's blockchain system was able to execute a deal in 4 hours.
- The LOC guaranteed the export of \$100K worth of agricultural products from Irish cooperative Ornuia to the Seychelles Trading Company.

# Possible Commercial Finance Applications – Trade Finance

## ■ Traditional Trade Finance

- Manual contract creation
- Invoice factoring
- Delayed timeline
- Manual AML review
- Multiple platforms
- Duplicative bills of lading
- Multiple versions of documents
- Delayed payment

## ■ Trade Finance With Blockchain Technology

- Smart contracts
- Import bank/export bank – real-time capability to view single set of agreements, documents, draft terms, etc.
- Digital acknowledgment of receipt of goods
- Automated payment via blockchain

# Blockchain Advantages – Trade Finance

- Real-time review
- Transparent factoring
- No trusted intermediary needed to assume risk
- Reduced counterparty risk
- Decentralized contract execution
- Proof of ownership
- Automated settlement and reduced transaction fees
- Regulatory transparency

# Possible Commercial Finance Applications – Syndicated Loans

- Permissioned ledger system of only authorized banks — Ability to share KYC information
- Allow potential loan purchasers to access diligence information on a secure platform
- Distribution of loan information for portfolio optimization
- Shipping documents issued on distributed ledger
- Reports can be delivered automatically
- Payments can be made through smart contracts (both payments for sales of participation, and servicing payments)
- Achieve consistent results in position marking

# Syndicated Loans – Barriers to Adoption

- Will banks be willing to share KYC information? Will banks be willing to rely on each others' KYC?
- Is borrower consent or agent consent required for trades?
- If DLT enables wider circulation of loan assets, who is the lender of record?
- Who is responsible for providing advances when required?
- Will bank regulators be comfortable with DLT recordkeeping?
- Who will create standardized identifiers for loans?
- Will banks be able to connect their general ledgers and risk systems to DLT systems, or will some form of manual synchronization be required?
- Will law firms be willing to issue legal opinions for partially automated contracts?

# Possible Commercial Finance Applications

## – Derivatives Trading

- Current use of standardized contracts and products make it easy to move to a smart contract system
- Market participants are familiar with electronic trading
- Reduce portfolio reconciliation complexities
- Ability to provide access to regulators/real-time reporting
- Potential for use of smart contracts to compress portfolios, freeing up margin and capital
- Margin calculation and calls through smart contracts
- Service providers such as DTCC and Traiana are moving to integrate with DLT solutions

# Derivatives Trading – Barriers to Adoption

- Need for data analytics - regulators do not want to see a simple transaction feed, they want to be able to pull specific data and analyze it
- Oracles will be required - will need information providers to sign up and agree to SLAs and fee structures
- Clearing agencies will still be necessary to disintermediate transactions
- Difficulty in transitioning from legacy systems
- While exchange-traded contracts are relatively easy to turn into smart contract code, will traders of OTC uncleared derivatives find DLT to be cost-efficient?
- UTIs and other required data standards are still under development

# Legal Risks and Opportunities

# Risks, Legal Issues and Opportunities

## ■ Risks

- Increased ledger transparency
  - Data privacy violations
  - Insider trading and market abuse
  - Identity theft
- Cyber risks
  - Tampering with data prior to storage
  - Cyber attacks
- Operational risks
  - Outdated or insufficient coding
  - Few SMEs

# Risks, Legal Issues and Opportunities

- Legal issues
  - State Laws
    - In 2018 session many states proposed or adopted various blockchain laws
    - States include AZ, CA, CO, CT, DE, FL, IL, MD, MI, MO, NE, NJ, NY, OH, TN, VT, VA, WY
    - Enacted laws include creating blockchain task forces (e.g., CA, CT, WY), allowing use of blockchain for certain types of corporate records (e.g., AZ, CA, DE, WY), and allows use of blockchain for contracts (e.g., TN).
  - Global Legal Blockchain Consortium (250 members)

# Legal concerns with implementation

- What regulatory registrations will the network operator need?
- How will the IP in the blockchain be protected? What warranties and service levels are needed?
- Who has access to the network and how is access controlled? Consider what security requirements network participants will have to meet.
- What information will be propagated to other nodes on the blockchain? Is that information subject to restrictions on sharing?
- Have a plan for how error transactions and bad actors are handled.
- Ensure clarity of ownership of data that is stored on the blockchain.
- If oracles will be used, it is necessary to ensure those oracles continue to provide correct information through service level agreements or other mechanisms.
- Consider how future software updates will be implemented and whether they will raise fresh security concerns.
- Can complex deals be incorporated into the blockchain?
- How is settlement finality determined?