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Blockchain Technology

Latest Developments

Presented by Keith Letourneau

March 22, 2018
Lunch'n Learn
Houston, TX

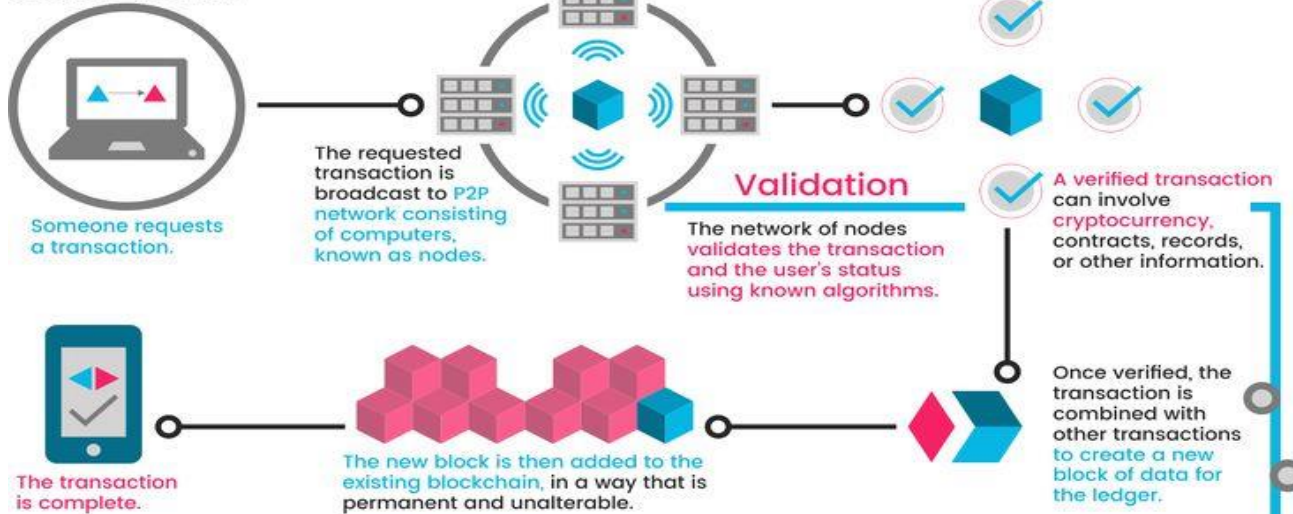
Cambridge Study – Sep 2017

200 Organizations / 57 Public Sector Institutions

- Blockchain's promise
 - Facilitate asset transfers without need for trusted central authority or intermediaries
 - Reduce fraud (\$4.0 trillion in 2016)
 - Streamline business processes across multiple entities
 - Increase record transparency and ease of audits
- Distributed Ledger Technology (“DLT”) landscape – fluid, highly fragmented, contested, complex
- Hurdles to implementation
 - Regulatory uncertainties and legal risks not yet fully recognized
 - Interoperability with existing systems – still in its infancy
 - Scalability, privacy and confidentiality
- 63% of central banks developing blockchain proofs of concept
 - 15% of OPSIs plan to deploy DLT-based applications this year; 23% within next two years

How Blockchain Works

How it works:



Cryptocurrency

Cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of monetary units and to verify the transfer of funds. Bitcoin is the best known example.



Has no intrinsic value in that it is not redeemable for another commodity, such as gold.



Has no physical form and exists only in the network.



Its supply is not determined by a central bank and the network is completely decentralized.



How Blockchain Works

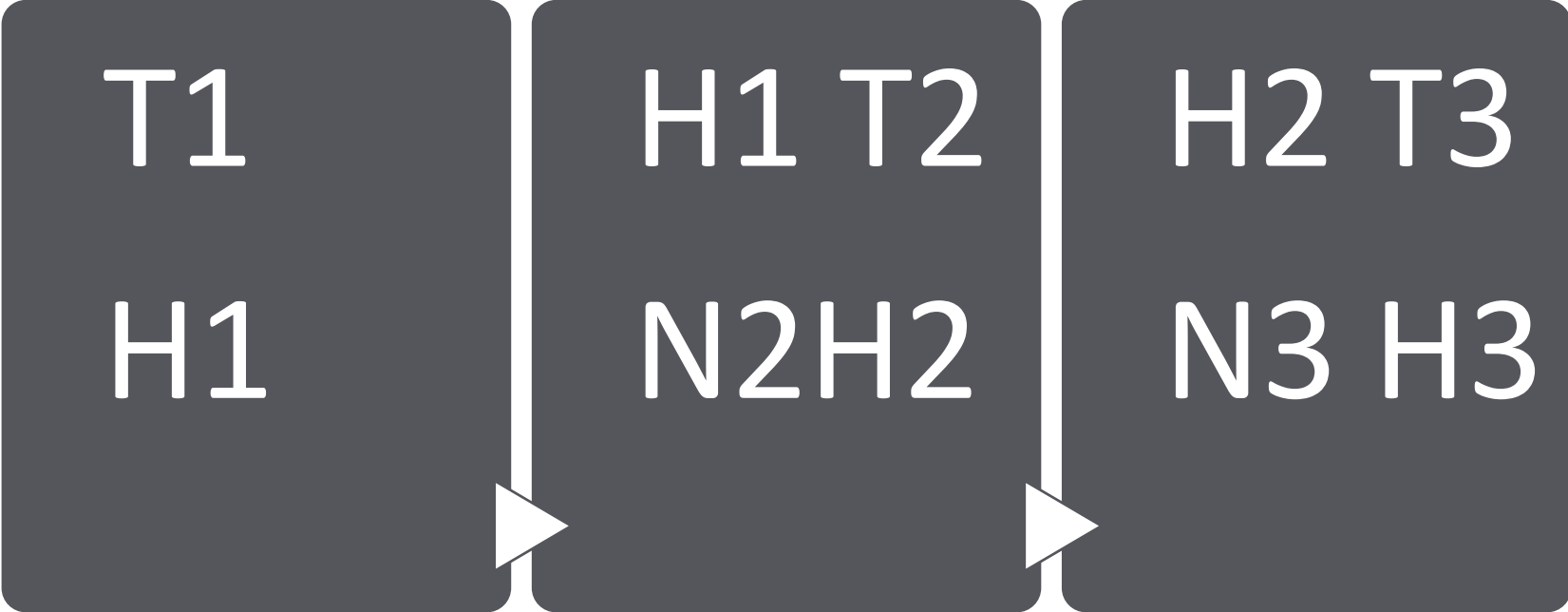
Blockchain

Block #	Nonce	Prev Hash	Hash
1	11316	00000000000000000000000000000000	000015783b764259d382017d91a36d206d0f
2	35230	000015783b764259d382017d91a36d206d0f	000012fa9b916eb9078f8d98a7864e697ae83
3	12937	000012fa9b916eb9078f8d98a7864e697ae83	0000b9015ce2a08b61216ba

https://youtu.be/_160oMzblY8?t=5m7s

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One Block to the Next



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Blockchain and Bitcoin Startups

BITCOIN & BLOCKCHAIN STARTUPS MARKET MAP

WALLETS & MONEY SERVICES



P2P MARKETPLACES & P2P LENDING



CRYPTOCURRENCY MINING



MERCHANT SERVICES



IoT, IDENTITY & CONTENT MANAGEMENT



EXCHANGES & CRYPTOCURRENCY TRADING



ENTERPRISE SERVICES & CURRENCIES



STORAGE, SECURITY & REGULATORY



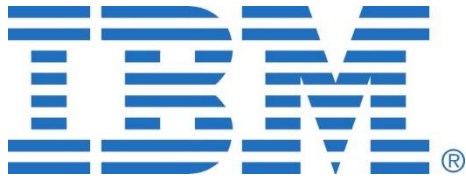
CAPITAL MARKETS & FINANCIAL SERVICES



SOCIAL & BROWSERS



Major Players



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Essential Characteristics of Blockchain Technology

- Decentralized peer-to-peer network
- Ledger accessible to all participants
- Near real-time status/access to transactions
- Key access
- Blockchain's Advantages
 - Immutable records
 - Disintermediation
 - Transparency
 - Better Encryption standards – multi-factor authentication
 - Security

Which Came First – The Chicken or the Chicken McNugget?



<https://youtu.be/g6iDZspbRMg?t=7m52s>

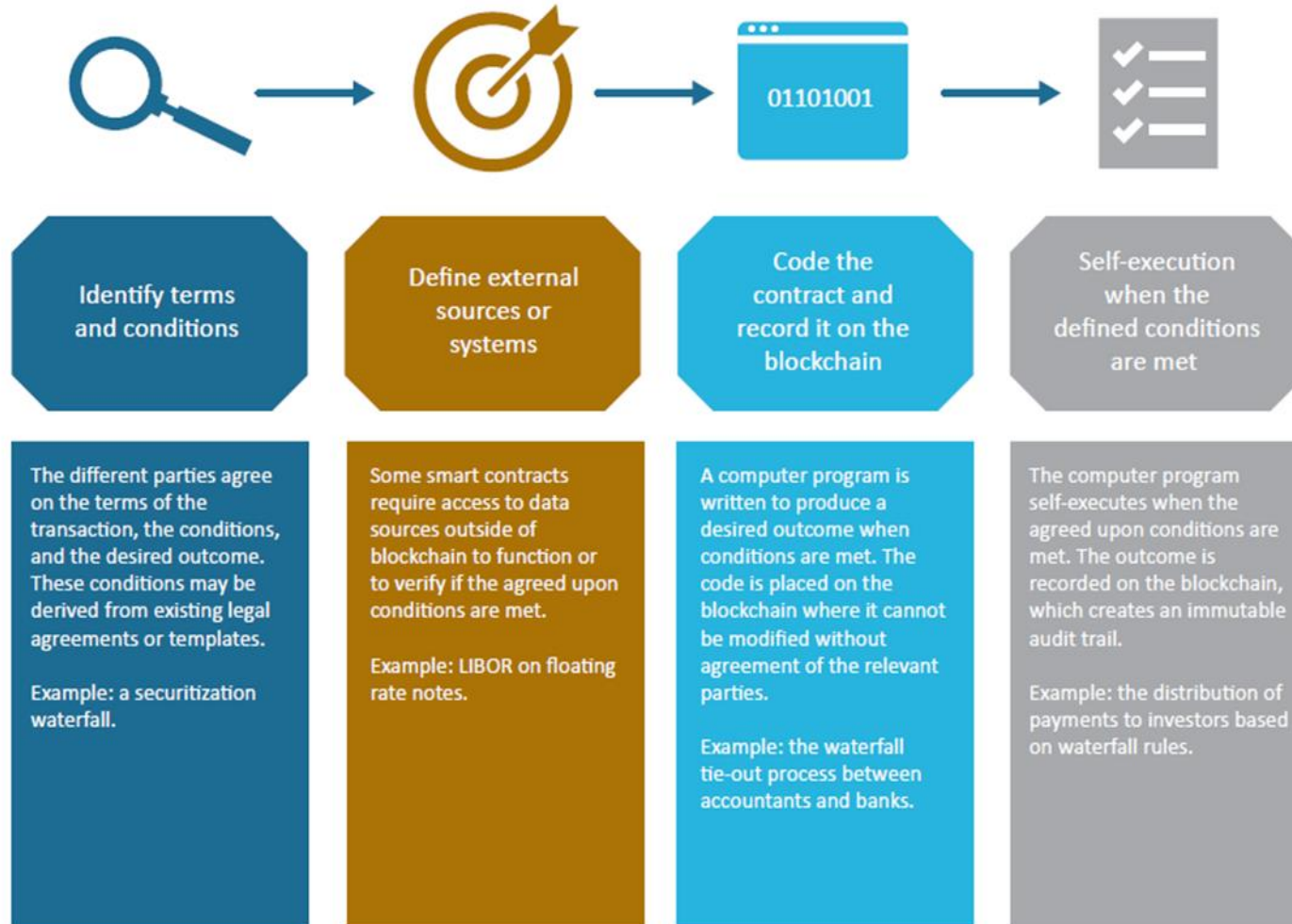
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Role of Smart Contracts

- Misnomer – not a contract
- Limited Utility
- Expedites processing of standardized transactional steps
- Block storage issues

Use Cases: Smart Contracts

Figure 1: How smart contracts work



Source: Deloitte Development LLC, 2017

Use Cases: Smart Contracts

- Enforceability
 - Electronic Signatures in Global and National Commerce Act (“ESIGN”)
 - State laws modeled on the Uniform Electronic Transaction Act (“UETA”) provide sufficient legal foundation for blockchain-based smart contracts to be enforced under current law.
 - The cryptographic key with which blockchain-based smart contracts are signed and acknowledged falls squarely within the language and intent of ESIGN and UETA as an “electronic signature.”
- Progressive jurisdictions:
 - Arizona
 - Nevada
 - Vermont
 - Delaware

What is this?

- A **smart contract** is a computer protocol designed to facilitate, verify, and enforce the performance of a contract.
- Data Gumbo is a BaaS platform that executes based smart contracts

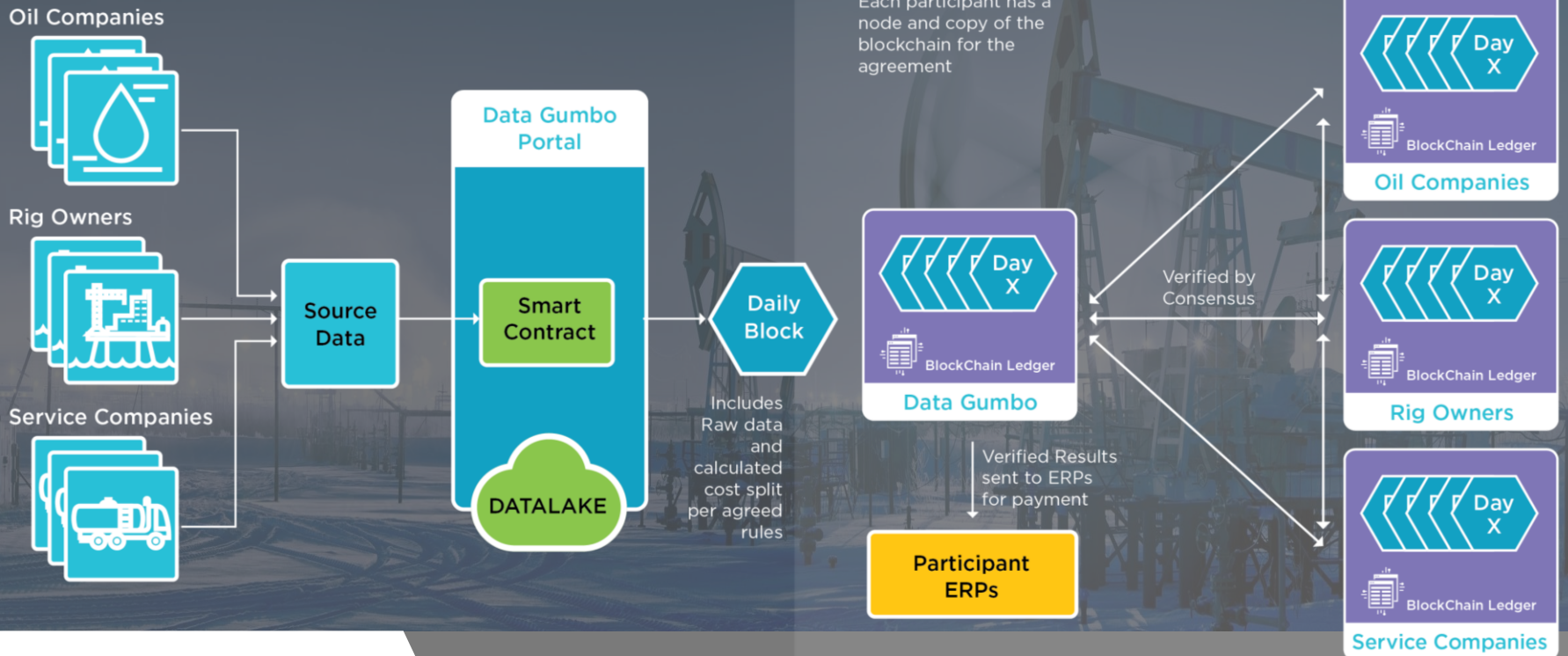
Tech Comparison

Distributed Ledger Tech Comparison						
	Bitcoin	Ethereum Public	Ethereum Private	R3 Corda	Hyperledger	Data Gumbo
Distributed Ledger	YES	YES	YES	YES	YES	YES
Secured by Crypto	YES	YES	YES	YES	YES	YES
Controlled access	NO	YES	YES	YES	YES	YES
Anonymous participants	YES	YES	NO	NO	NO	NO
Requires Tokens	YES	YES	MAYBE	NO	NO	NO
Requires Mining	YES	YES	YES	NO	NO	NO
Public	YES	YES	NO	NO	NO	NO
Open Source	YES	YES	MAYBE	YES	YES	NO
Smart Contracts	YES	YES	YES	YES	YES	YES
Smart Contract Code	NO	YES	YES	YES	YES	YES
Configurable Blocksize	NO	NO	NO	N/A	YES (limited)	YES
Large Block Sizes >1MB	NO	NO	NO	N/A	NO	YES
Configurable Consensus	NO	NO	YES	YES	YES	YES
Block Frequency (FEB 18)	10 Minutes	~12 Seconds	3 Seconds	N/A	N/A	Configurable
Configurable Block Frequency	NO	NO	YES	N/A	N/A	YES
Different Node Roles	NO	NO	MAYBE	YES	YES	YES
Vulnerable to 51%	YES	YES	NO	NO	NO	NO
IoT Platform	NO	NO	NO	NO	NO	YES
Works with other Blockchains	NO	NO	MAYBE	MAYBE	MAYBE	YES
Designed For	Anarchists	Internet	Internet	Finance	Industry	Industry

Block Size

- Each variety of block chain has different constraints around the block size. Ethereum has a maximum block size of 44kb.
- Ethereum Solutions:
 - Store Data off the chain (destroys immutability and distributed nature)
 - Spread data across 100s or 1000s of blocks
- Most current blockchains are optimized for fintech / high transactions per second. Industrial blockchains need lower volume / higher storage transactions

Data Gumbo - Blockchain As A Service



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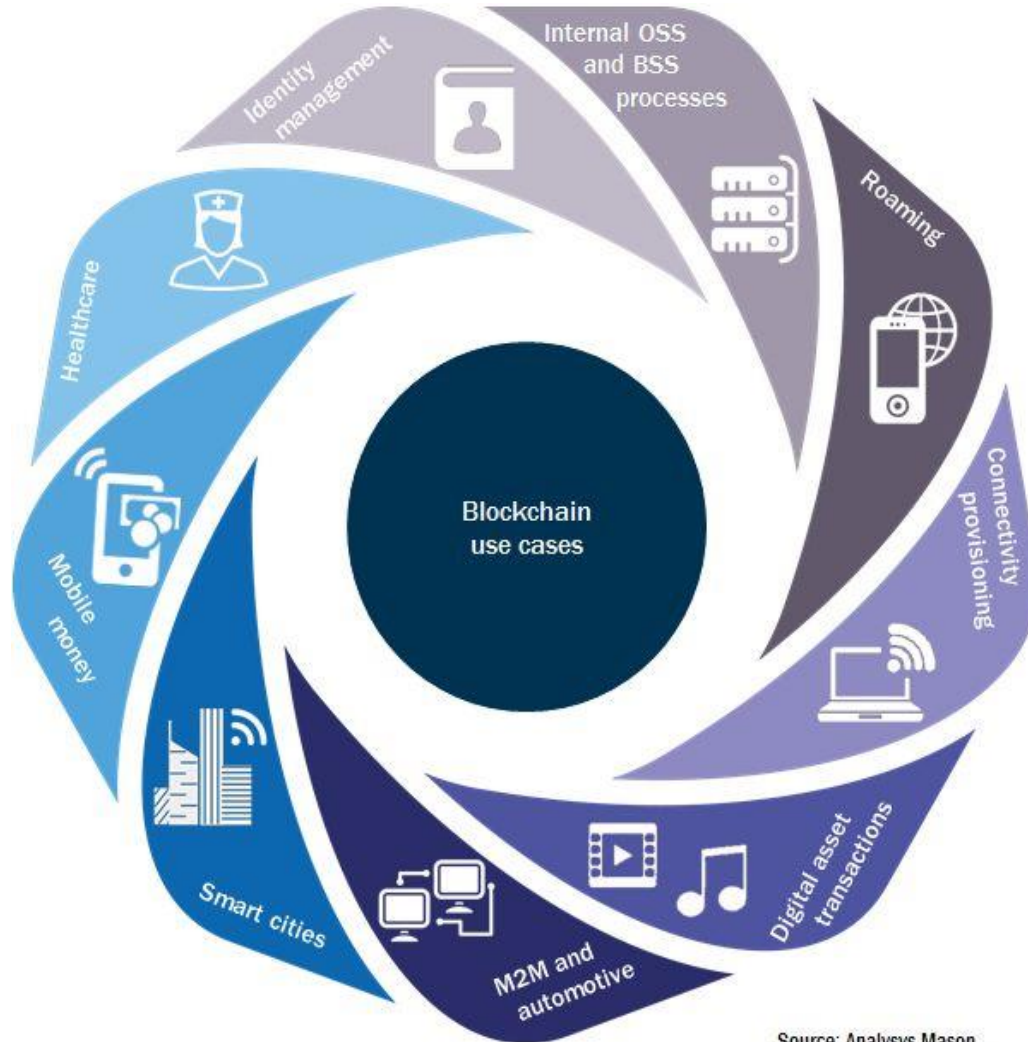
Potential Illicit Uses and Abuses of Blockchain

- Proliferation of illegal or banned materials
 - Political
 - Libelous
 - Criminal
- Distributed Ledger – every node on the network is a recipient (possessor) and arguably a conveyor
- Company Compliance Officers
 - Responsible for vetting materials added to the ledger
 - But what about materials added to the ledger by others?

Industries Evaluating and Adopting Blockchain

- Blockchain is poised to impact every industry imaginable
 - Banking/Financial Services/Securities – trade, letters of credit, ICOs
 - Real estate – property records
 - Education – issuance of diplomas
 - Energy trading
 - Marine Insurance – XL Catlin, Ernst & Young, and Guardtime
 - Healthcare/biotech – medical records, clinical trials, prescription supply chain management
 - Maritime – supply chain management, contracts of carriage/bills of lading

Blockchain Use Cases



Source: Analysys Mason

Maritime

- Maersk-IBM JV – developed blockchain application to track shipping containers digitizing the supply chain process from start to finish.
 - 90% of world's goods are carried by ocean carriers
 - Program intended to encompass shippers, freight forwarders, carriers, ports and customs authorities
 - Designed to reduce paper trail, reduce cost and complexity of trading, create transparency, reduce fraud and errors, reduce time in transit, improve inventory management, reduce the cost of goods, enhance global trade from both emerging markets and developed countries
 - In 2014, Maersk found that a simple shipment of refrigerated containers from East Africa to Europe can involve nearly 30 people and organization and more than 200 different interactions and communications among them
 - Costs associated with trade documentation are estimated to account for 1/5th of actual transportation costs

Maritime (cont.)

- Letters of Credit
- Contracts of Carriage/Bills of Lading
- Digital Bills of Lading
- Tracking containers and goods
 - Hyundai Merchant Marine – shipment of goods from South Korea to China – employed paperless processes – shipment booking, cargo delivery.

Supply-Chain Management

- Present Day: Point-to-Point
 - Numerous stages and geographic locations
 - Use of intermediaries to consummate transactions, convey information
 - Raises transaction costs with intermediate mark-ups and fees
 - Difficult to trace events and incidents, e.g., counterfeiting, forced labor, damaged goods
- Blockchain: Shared, synchronized information available to all network participants
 - Supply chain status readily available
 - Records transaction details that cannot be altered without consent of all parties
 - Capable of tracing products to origin and raw materials used (e.g., tuna tracked from hook to fork using sensors)
- Blockchain in Transport Alliance

Banking

- Clearing and Settlement
 - Australian Securities Exchange – attempting to shift much of its post-trade clearing and settlement to blockchain system
 - DTCC, IBM, R3 and Axoni – attempting to shift post-clearing of single name credit default swaps to blockchain by end of 2018
- Payments – Cryptocurrencies pose challenges to central bank control of monetary policy
 - Barclays, UBS – utility settlement coin – developing digital currency for use in financial markets by issuing tokens convertible into cash on deposit at central banks
 - Cross-border payments – SWIFT on one hand; Ripple using blockchain on the other

Banking (cont.)

- Identity – verification of customers and counterparties
 - R3's Corda – central to application is identity verification
 - Cambridge Blockchain (identity compliance application), Credits (aimed at financial industry), Blockstack (open source alternate public-key structure application)
- Product Offerings susceptible to blockchain applications
 - Cross-border structured financial transactions – Deloitte - blockchain can streamline processes, lower costs, increase transparency, enhance security , lower risk
 - Issuing and paying agent for domestic and global programs
 - Mortgage market – paper-intensive and lengthy delays between sale and closing; blockchain – lower processing costs and time through automation, process redesign, shared access to electronic versions of legal documents, and access to external sources of information, e.g., deeds

Trade and Finance

- Payment reconciliation
- Trade Finance – paper-intensive processes using bills of lading and letters of credit
 - UBS – digitizing letters of credit
 - Wave (Israel), Ess Docs (Malta), Bolero (UK) – digitizing bills of lading
 - May take up to 5 years to digitize trade ecosystems
 - Batavia – consortium working on int'l trade transactions using blockchain

Healthcare

- Medical records
 - ConnectingCare – completed trial that connects providers from different clinical organizations to same platform
 - Can view same data for shared patients
- Pharmaceutical Supply Chains
 - MediLedger Project – interoperable system to identify and trace certain prescription drugs
 - Brings competing manufacturers and wholesalers to same platform
- Claims and Billing Management
- Medical Research
- Data Security

Real Estate

- Real Estate worth \$217 Trillion Worldwide
- Property Recordation
 - Immutable records
 - Over time – reduction in title transfer issues
 - Cook County, Illinois, began the nation's first to experiment with blockchain technology to transfer and track property titles.
 - Buyer receives a digital token and the traditional paper deed. Documentation of the token transfer is used as proof of ownership. Tokens could become the standard and take the place of paper deeds altogether.
 - ATLANT allows sellers to tokenize assets handling it like a stock sale, and liquidating the asset through a token sale using the platform.
- Efficiency and Security of Transactions
- Creation of Nationwide MLS – type network
 - Secure sharing of data makes a nationwide database possible with real-time access to property information

Energy Trading

- Renewable Energy
 - Certificates of Origin
- Commodities
 - Commodity trade finance platform to facilitate U.S. crude oil transactions.
 - Project to execute wholesale power and natural gas transactions on a blockchain-enabled platform.
 - Oil majors BP Plc, Royal Dutch Shell Plc, and Statoil ASA, commodity traders Gunvor Group Ltd., Mercuria and Koch Supply & Trading, and lenders ING Groep NV, ABN Amro Bank NV, and Societe Generale SA are developing a blockchain-based platform for physical oil trades.
 - Purpose is to create secure, real-time blockchain-based digital platform to manage physical energy transactions from trade entry to final settlement
- Other Pilot Projects
 - Letter of credit process for crude cargo transactions.
 - Transaction reconciliation process.

Relationship with Cryptocurrencies

Public versus Private/Permissioned Blockchains

Public

Permission-less where anyone can read the distributed ledger, send transactions to and watch them being included in the ledger (if valid), and participate in the consensus process

Private

Each member of the network has access rights so that confidential information is shared on a need-to-know basis

Cryptocurrency Risks/Current Regulatory Climate

- The lack of current domestic and foreign regulatory clarity
 - U.S. regulators are still coming to grips with regulatory oversight of cryptocurrencies, but they have made significant movements in recent months
 - Many foreign jurisdictions do not regulate virtual currency businesses, and do not require them to maintain customer records
- The likelihood that regulators will assert jurisdiction to prevent fraud and abuse.
 - SEC/CFTC jurisdiction
 - If ICO is structured in a way that it involves the sale of securities or derivatives, may fall within SEC's jurisdiction, which regulates issuers, brokers, investment advisors, investment companies and dealers in securities, or CFTC's jurisdiction, which regulates merchants and brokers in commodities
 - FinCEN Letter
 - Sale of convertible virtual currencies (e.g., ICO coins and tokens) in exchange for another type of value that substitutes for currency is a money transmitter and must comply with AML/CFT regulations
- Risk to investors that fraud committed by token issuers and others could lead to investment losses

Current Regulatory Climate

- SEC's DAO Policy Letter
 - July 2017 – SEC cautioned market participants that offers and sales of digital assets by "virtual" organizations are subject to the requirements of the federal securities laws
 - Issuers of blockchain technology-based securities must register offers and sales of such securities unless a valid exemption applies. Those participating in unregistered offerings also may be liable for violations of the securities laws.

Current Regulatory Climate (cont.)

- SEC Investigations

- SEC Action Halts ICO Scam – First Charges filed by SEC’s new Cyber Unit
 - Focus is on Distributed Ledger Technology and Initial Coin Offerings
- March 1, 2018 news report – U.S. regulators have sent a number of subpoenas and requests for information to firms to gather information on potential securities law violations
 - Broad investigation of virtual currency investments
 - SEC Chairman has repeatedly said that vast majority of ICOs should be registered with the SEC
 - SEC Enforcement Division’s Cyber Unit, which was created last year, coordinating subpoenas

Current Regulatory Climate (cont.)

- CFTC Authority
 - CFTC v. McDonnell, et al (EDNY Mar. 6, 2018) – District Court ruled that CFTC can regulate cryptocurrencies as commodities under the Commodity Exchange Act and has jurisdiction for fraud relating to digital currencies
 - Bitcoin Futures Started Trading as Regulators Gave Thumbs Up
 - CFTC has allowed 2 Chicago exchanges to launch Bitcoin Futures, though it is developing a "heightened review process" for cryptocurrency futures

Latest Update – FinCEN Letter

- Treasury Department's Financial Criminal Enforcement Network (FinCEN) issued a letter on Feb 13, 2008 to Congress that sets forth its enforcement intentions:
 - Anti-Money Laundering/Combating the Financing of Terror (AML/CFT) Rules apply to virtual currencies
 - Combatting abuse of payment systems by illicit financiers – priority issue for FinCEN
 - Virtual currency exchangers and administrators are money transmitters and must comply with the Bank Secrecy Act's implementing regulations
- The SEC's assertion of broader jurisdiction in this area should incentivize many participants to assume that their token offerings are going to be regulated as securities offerings and proceed accordingly.
- Our expectation is that much of this activity will quickly come to be conducted under the Securities Act and that the attempted reliance on "utility" tokens may fall away.
- If a class of true utility tokens emerges, those would be subject to regulation by FinCEN as Treasury asserts in the letter

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Legislative Developments

- U.S. Senate – Anti-Money Laundering Bill
 - Will criminalize intentional concealment of ownership or control of a financial account, which will include digital currencies and exchanges
 - Congress would prefer that the AML/KYC obligations of digital currency exchangers be codified in law rather than simply exist in guidance issued by FinCEN
- New York Bill Introduced to Recognize Blockchain Signatures
 - Also authorizes use of smart contracts in commerce
- New York token bills
- Tennessee prevents retirement funds from investing in crypto currencies
- Arizona permits payment of taxes using virtual currencies
- Wyoming passes five pro-blockchain laws

Other Legal Issues

- Intellectual Property
- Divided Infringement
 - Under U.S. patent law, only a single actor can infringe a patent.
 - If more than one actor, one entity must direct or control acts of others
- Extraterritoriality
 - Under U.S. patent law, all portions of a patented system must occur and be within the United States.
 - To prove infringement, patentee must prove that the benefit of the invention is being derived inside the United States

Hurdles to Implementation

- Scalability
- Network adoption
- Electricity consumption
- Computing power requirements
- Proof of Concept v. Operational Implementation Stage (Not a mature, fully understood area)
 - big disconnect/gap between theory and practice
- Myriad Platforms
- Interoperability
- Privacy v. Transparency
- Regulatory Compliance
 - Securities and Commodities regulation
 - Financial surveillance and anti-money laundering

Blockchain Challenges

ENVIRONMENTAL IMPACT:

- One Bitcoin transaction now uses as much energy as the average American house in a week.
- There are currently 300,000 transactions per day.
- “Blockchain is inefficient tech by design...”

Is public blockchain sustainable...?

Fun Blockchain Videos

John Oliver, Last Week Tonight

<https://www.youtube.com/watch?v=g6iDZspbRMg>

Blockchain Explained

<https://medium.com/@robertgreenfieldiv/explaining-proof-of-stake-f1eae6feb26f>

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Questions?

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Upcoming Event: April 4

Natural Disasters & Severe Weather: From Recovery to Resilience

Join our recognized team of Insurance Recovery and Emergency Response professionals for an important panel discussion on how to recover from a natural disaster like Hurricane Harvey, and how to become more resilient to future disasters.



Scan with phone
camera for website

Wednesday, April 4

3:30–5:30 p.m.

Cocktail reception to follow

Offering 1.5 TX CLE and CPE in Accounting and Insurance

Contact aleon@blankrome.com for details

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