BLOCKCHAIN: Technology, Applications & Risks
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Bitcoin - How it all started

- This seminar is not about bitcoin, but you need to know how the Blockchain revolution started
- Bitcoin is a cryptocurrency traded using Internet
- Born two months after financial meltdown of 2008-09
- Countries produce fiat currency based on full faith and guarantee by a government
- Bitcoin is based on full faith (kind of) of buyers and sellers in that currency - ascertained by miners
- Concept for bitcoin started from Satoshi Nakamoto (may be pseudonym) in 2008 during global collapse of banking system

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Bitcoin - How it all started

- Bitcoin is based on peer-to-peer open ledger solutions accessible to anybody with no central authority.
- Cryptographic and mathematical functions such as hashing, digital signatures are used to secure integrity of transactions.
- Blockchain is the technology that makes bitcoins possible.
- Unlike a central bank or a commercial bank, there is no trusted central authority in bitcoin.
- Sanctity of ownership and transfer is decided by agreement between the keepers of ledgers.

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Bitcoin - How it all started

- Many transactions constitute a block and a signature of the block (hash function) gets into the next block to create a chain
- Immensity of joint computational power of miners make it impossible to create a fake chain
- Cryptographic technique creates immutable history
- That makes CBA of fraudster unsustainable
So, what is Blockchain?

• Blockchain is a distributed database (aka distributed ledger) that maintains a continuously growing list of data records hardened against tampering and revision
• Each block contains a timestamp and information linking it to a previous block
• The Blockchain is seen as the main technical innovation of bitcoin, where it serves as the public ledger of all bitcoin transactions
So, what is Blockchain?

- Blockchain 2.0 is a term used in the distributed blockchain database field
- Second-generation programmable blockchain is coming with a Turing Complete programming language that allows users to write more sophisticated smart contracts
So, what is Blockchain?

- Remember that a blockchain implementation consists of two kinds of records: transactions and blocks.
- So, blockchain is trusting a third party vs. collective responsibility by consensus of majority.
- Blockchain is single source of truth.
- What are the big hurdles are: technical, policy, regulatory, incumbents, energy consumptions.
- So, what to do? - education and pilot a project.
Benefits of Blockchain?

- Blockchain = TRUST
- Perhaps the biggest innovation in the next 100 years
- Example:
  - Transfer money overseas of 600 Billion USD market, clearing and settlement delay, middlemen takes 5-10 percent, exchange risk
  - Blockchain makes it instantaneous with 0.25 percent fees
- Can be used for integrity of votes, intellectual property, physical property etc.
- Anything requiring immutability

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Current Uses of Blockchain?

- It is used by Microsoft and others
  - Payment system
  - Gold investing - DIGIX
  - Crowdfunding - Indiegogo,
  - Corporate finance - The DAO - 1172 million DAO tokens created by mid-2016

- Future
  - IOT
  - Casinos and lotteries
  - Prediction markets - e.g. predictit
  - Webhosting e.g. swarm
  - Social networks e.g. AKASHA
  - Energy transfer e.g. TransActive Grid
  - Land ownership, South America, India

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Characteristics of Blockchain

- Characteristics of Blockchain
  - Immutability of records
  - No central authority
  - Sharing economy (e.g. is AIRbnb sharing economy?)
  - Identity management
  - IP Protection

- Value creation
  - IP protection
  - Art
  - Songs
  - Discoveries

- Remember, Bitcoin is only for money, value can be for any possession, not just money
Major Transformations of Blockchain

- Financial systems for 2.5 Billion people who have no identity for financial background
- Protecting rights through immutable records
  - Land records
- Sharing economy
  - Uber and AIRbnb don’t share, there is a middleman
- Remittance rip off
  - 600 Billion industry
  - Developed to developing countries
Major Transformations of Blockchain

• Citizens to monetize data and protect privacy
  ▪ Identity protection

• Due compensation for IP
  ▪ Songs, books, articles,

• Create golden age of entrepreneurship
  ▪ No middle person
  ▪ No transaction cost, direct contract

• Reinventing government
  ▪ Voting integrity, accountability for promises,
Banking Sector

- Fifteen percent of banks plan to use blockchain in 2017
- Expect savings in cost, time, and risk mitigation
- Costly and time-consuming reconciliations are all but eliminated and an instantaneously verifiable audit trail discourages bad actors and potential for fraud
Banking Sector Applications

- There is no cookie-cutter approach
  - All is custom-tailored

- Reference data
  - Reference data is a term used in the finance industry to describe counterparty and security identifiers used when making a trade.
  - As opposed to market data, the reference data is used to complete financial transactions and settle those transactions.
  - On blockchains, reference data is automatically captured in real time, and validated and shared as permitted across various business divisions.
Banking Sector Applications

• Retail payments
  ▪ Transactions eliminate the time and labor required for reconciliations, thus they minimize errors, and significantly reduce the time needed for settlement

• Consumer lending
  ▪ Cost savings are particularly attractive in consumer lending
  ▪ Lack of credit history and identity fraud has made it difficult to grant loans to unbanked customers. On blockchains, as new kinds of verifiable transaction data is captured, enhanced identity and know your customer (KYC) data could open up emerging markets to banks.
New Banking Sector Applications

New business models in two areas:

- **Trade finance**
  - Bank-intermediated short-term trade finance alone is estimated to be USD 6-8 trillion worldwide

- **Corporate Lending**
 Banking Sector

• Pioneer banks are made up of a disproportionate number of medium sized banks and not large banks
• Medium size banks are more than twice as likely than large institutions (large ones usually number more than a hundred thousand employees)
• Goal is to improve accuracy of information used to make decisions
• Deposit taking
  ▪ 90 percent of banks are looking into deposit taking in 2018 against non-bank competition
Banking Sector

Banks expect 5 out of 9 core business areas to experience disruption due to blockchain

- Reference data - **major disruption**
- Retail payments - **major disruption**
- Consumer lending - **major disruption**
- Other cash management
- Trade financing
- Corporate lending - **major disruption**
- Mortgages
- Deposit taking - **major disruption**
- International payments

*Remember: lending and payments are the bread and butter of banking*

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Banking Sector - Corporate Lending

• Corporate lending
  ▪ Lengthy settlement periods, often 20 days or more, are a drag on corporate lending, tying up capital and exposing banks to new and nimbler competitors
  ▪ Smart contracts on blockchains promise to dramatically reduce the time to settlement
  ▪ A more radical model, direct peer-to-peer lending on a blockchain, is already being tested by microenterprises and could prove applicable to larger institutions that want to expand their customer bases
  ▪ The peer-to-peer model, of course, could also threaten those incumbent banks that move too slowly
Banking Sector

• With greater access to **reliable historical data and real-time trade transactions**, banks stand a good chance greatly improving the profitability of financing as well as the acquisition of new clients

• **Alibaba**, China’s largest e-commerce enterprise has set its sights on providing its own **financial services including trade finance**, and is exploring blockchain-enabled financial services
Banking Sector

• All banks agree that deposit taking is primed for disruption
• Security and privacy standards will bring more participants into blockchain
Insurance Sector Growth Opportunities

Where is growth?

- Platform for **customer controlled personal data**
- Peer-to-peer insurances
- Smart contracts
  - Flight insurance cancellation and reassignment when flight is cancelled, payment initiation to meet certain criteria
  - Automation of claims handling
  - Car accident repair payments
  - Automation of underwriting policies and payments
Insurance Sector Growth Opportunities

Where is growth?

- **Fraud detection**, 5 to 10 percent of claims are fraud (FBI)
- Fraud costs USD 40 billion a year (non-health insurers)
  - Mitigation through authenticity, ownership, and provenance through blockchain
  - Detect **patterns of fraud** to a specific identity
  - Date of policy and date of purchase of a product
- **Fraud detection of knockouts**
  - Counterfeits, stolen goods, fraudulent transactions

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Smart Contracts: How they work

- Understand **how smart contracts work**
- Distinguishing smart contracts from contractual agreements
- Business opportunities and the impact of smart contracts on mainstream markets
- The current legal status of smart contracts
- The Delaware Blockchain Initiative
Distributed Ledgers

- Distributed ledgers and risk management
- Revolutionizing security and transparency
- Consumer identity and fraud protection
- Identifying suspicious behavior
- Real-time intelligence
Private Blockchains, a/k/a Permissioned Blockchains

- Blockchain may be applied to any data structure which batches data into blocks which are timestamped and that these blockchains serve as a distributed version of multi-version concurrency controls (MVCC) in databases.

- But the opponents say that the permissioned systems look like traditional corporate databases, not supporting decentralized verification of the data, and that such systems are not hardened against tampering and revision by their operators.
Private Blockchains, a/k/a Permissioned Blockchains

- The *Harvard Business Review* conducted a two-year research project exploring how blockchain technology can change the way we securely move and store host "*money, titles, deeds, music, art, scientific discoveries, intellectual property, and even votes*"
- Many Bitcoin Core developers discouraged embedding large messages in the bitcoin blockchain. Other applications store a hash value in the blockchain, **recording data existence and confirming data integrity without revealing data**
Supply chain provenance

- Medicines (drugs) from manufacturer to pharmacist to consumer
- Consumables e.g. designer shoes, purses (Hermes, LVMH et al)
- Food - farm to store to consumer
Blockchain Platforms - Hyperledger

- The Linux Foundation’s open-source technology initiative, Hyperledger
- Institutions are working together on Hyperledger to set the technology standards that advance interoperability across blockchains
- It also ensures that blockchain platforms can evolve as conditions change
BLOCKCHAIN: Risks
Risks / Show Stoppers

- Is technology ready for primetime?
- Governments overregulation
- Lack of incentives for mass collaboration
- Problems with governing protocols
- Governments may escalate controls
Risks / Show Stoppers

- Too much **energy** consumption - not green
- Powerful **incumbents** may usurp it
- Blockchain may **kill jobs**
- Distributed autonomous agents may be "**Skynet**"
  - **Skynet** is a fictional neural net-based conscious group mind and artificial general intelligence
- **Criminals favorite** (e.g. ransomware)
Evolution

- **2009 to 2016 is experimental stage** where solutions are bitcoin-based knowledge
- The **firm expects 20 to 30 POC use cases** for will be tested in 2018,
  - 10 to 20 successful business cases will survive and be deployed by late 2020
- Current issues are **that blockchain is driving business, it should be the other way around**
Evolution

- **Insurance industry** has the largest non-bitcoin blockchain solutions, with 22 percent, followed by the payments industry, with 13 percent.
- **Financial Services in general** make up 50 percent of the total mix.
- In terms of **dollars value**, the biggest revenue generating sector is cross-border business to business (B2B) payments, generating between $50-$60 billion, followed by trade finance with $14-$17 billion.
Where the money is

- **Trade Finance**
  - It can lower costs and speed up turnarounds to a revenue boost of between $14 and $17 billion

- **Cross-border B2B payments**
  - Lower costs and fees plus speedier delivery will save around $50 - $60 billion

- **Cross-border P2P payments**
  - Like B2B payments can lower costs while adding speed, but do so for personal remittances, should add $3 - $5 billion to their bottom line (P2P is person to person)
Where the money is

- **Repurchase Agreement Transactions**
  - Blockchains will lower operational costs and systematic risks, is worth around $2 to $5 billion

- **OTC Derivatives**
  - Streamlined settlements lead to reduced operational costs and need for capital. $4 - $7 billion more saved here

- **KYC/AML**
  - It reduces duplicated effort and smooths the on-boarding process, worth between $4 and $8 billion

- **Identity Fraud**
  - More security leads to fewer damage payouts and satisfied customers, $7 to $9 billion saved here
Timeline

• Another 10 years before full potential is realized. That’s the tipping point
  ▪ Tipping point comes when a series of small changes or incidents becomes significant enough to cause a larger, more important change
• In another three to five years, majority of large players will use blockchain technology
• Global business consulting firm Accenture has a similar timeline, with a two-year shorter timeframe, but...
  ▪ Early adoption is 2017-18
  ▪ Growth is 2018-24
  ▪ Maturity is will come 2025-27
Questions?
Conclusion

Thank you for your participation!

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More Questions?

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