

Blockchain & Money



Class 11

October 16, 2018

Class 10 Overview

- Readings and Study Questions
- Blockchain Economics
- Blockchain vs. Internet
- The Minimalists
- Costs and Trade-offs
- Conclusions

Class 11 (10/16): Study Questions

- How do decentralized blockchain applications affect the cost of verification and the cost of networking? How do blockchain applications affect market power?
- What might the economics and organization of the Internet - with its protocol layers and applications - tell us about the future of blockchain technology?
- What lessons should be drawn from crypto skeptics – Krugman, Stiglitz, Roubini, Gates, Buffett, Dimon, & others - about the economic potential for blockchain technology? What is an answer to the oft stated query: ‘what problem do cryptocurrencies solve?’

Class 11 (10/16): Readings

- *'Why Bitcoin is and isn't the Internet'* Ito
- *'Some Simple Economics of the Blockchain'* Catalini and Glans
- *'Transaction Costs and Tethers: Why I'm a Crypto Sceptic'* Krugman
- *'Billionaire Bill Gates once got bitcoin for a birthday gift – Here's what he did with it'* CNBC
- *'Dr. Doom' Economist Nouriel Roubini Bearish on Everything Crypto'* Forbes

Additional

- *'Exploring the Cryptocurrency and Blockchain Ecosystem'* Roubini

Optional

- *'The Economic Limits of Bitcoin and the Blockchain'* Budish
- *'Valuing Bitcoin and Ethereum with Metcalf's Law'* Clearblocks
- *'The Meaning of Decentralization'* Buterin ⁴

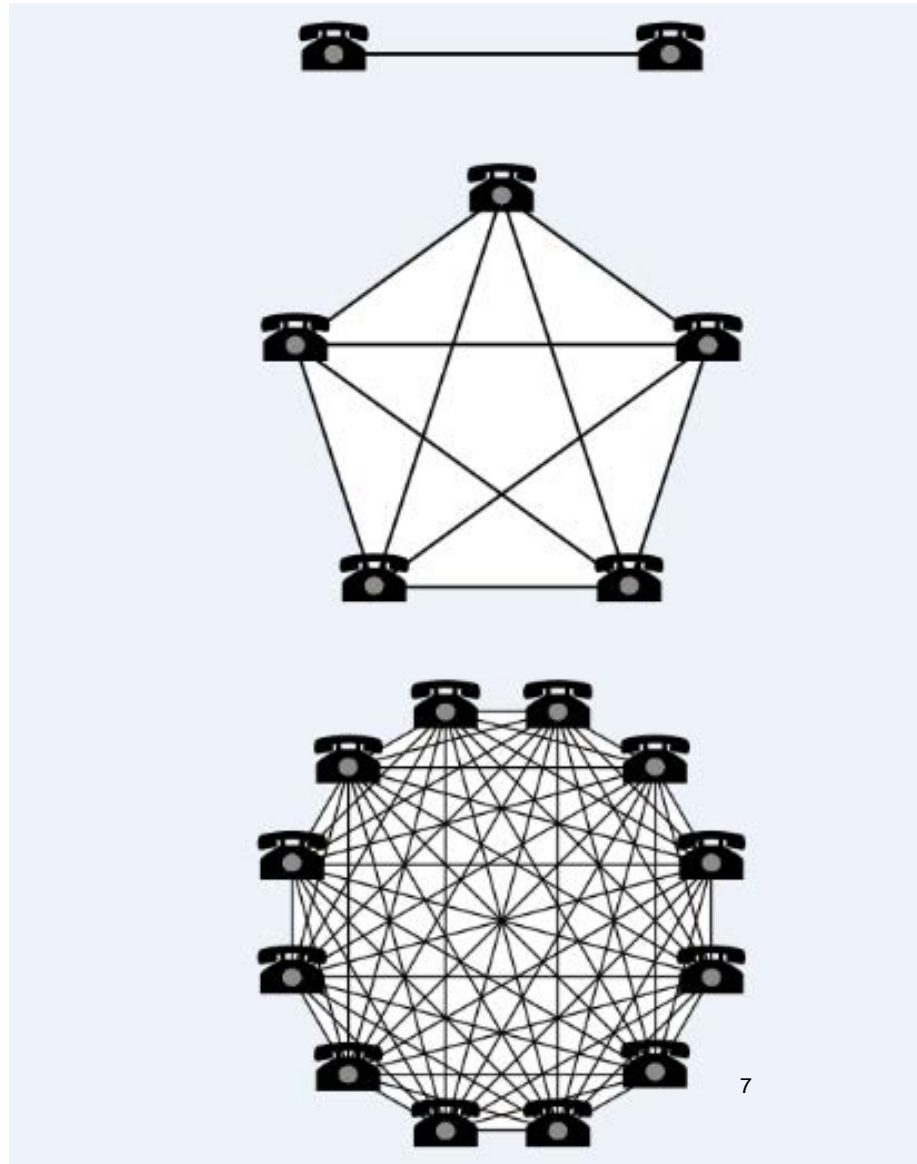
Blockchain Economics

- Verification - Tracking, Settling & Enforcing Transactions and Contracts
 - Ability to Lower Costs to Verify Transactions, Particularly Digital Assets
- Direct Costs
- Privacy and Data Leakage Costs
- Censorship Risks
- Settlement - Timeliness and Certainty of Finality
- Costs of Trust
 - Code & Consensus Protocol vs. Trust in Central Intermediary
- Economic Rents due to Market Power

Blockchain Economics

- Networking – Moving Property Rights across a Network
 - Ability to Lower Costs to Develop and Operate a Network
- Tokens provide Opportunity to Pre Fund Development
- Tokens provide Incentive Mechanism During Operating Phase

Metcalfe's Law



Modified Metcalfe's Law

$$n \times \log n$$

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Internet Protocols: A new layer?

 - 2009

SSL / TLS - 1996

HTTP- 1990

TCP/IP - 1974

Ethernet - 1974

???

 1998

 1995

 1984

 1979

Blockchain vs. Internet

- Both Open protocols
- Both Transport packets of data on distributed networks
 - Property Rights vs. Content
- Both can have Apps built upon Protocol or Cryptocurrency level
- Both said to be Open Network Development
 - Though Centralized through groups such as ICANN or Bitcoin Core Developers
- Interoperability
 - A Blockchain is akin to a Private Intranet vs. the Internet
- Incentives – Registrars and Registries vs. Miners
- Origins in Relation to Governments – Coordinated vs. Limited Trust
- Significant Investment – Blockchain far earlier than Internet

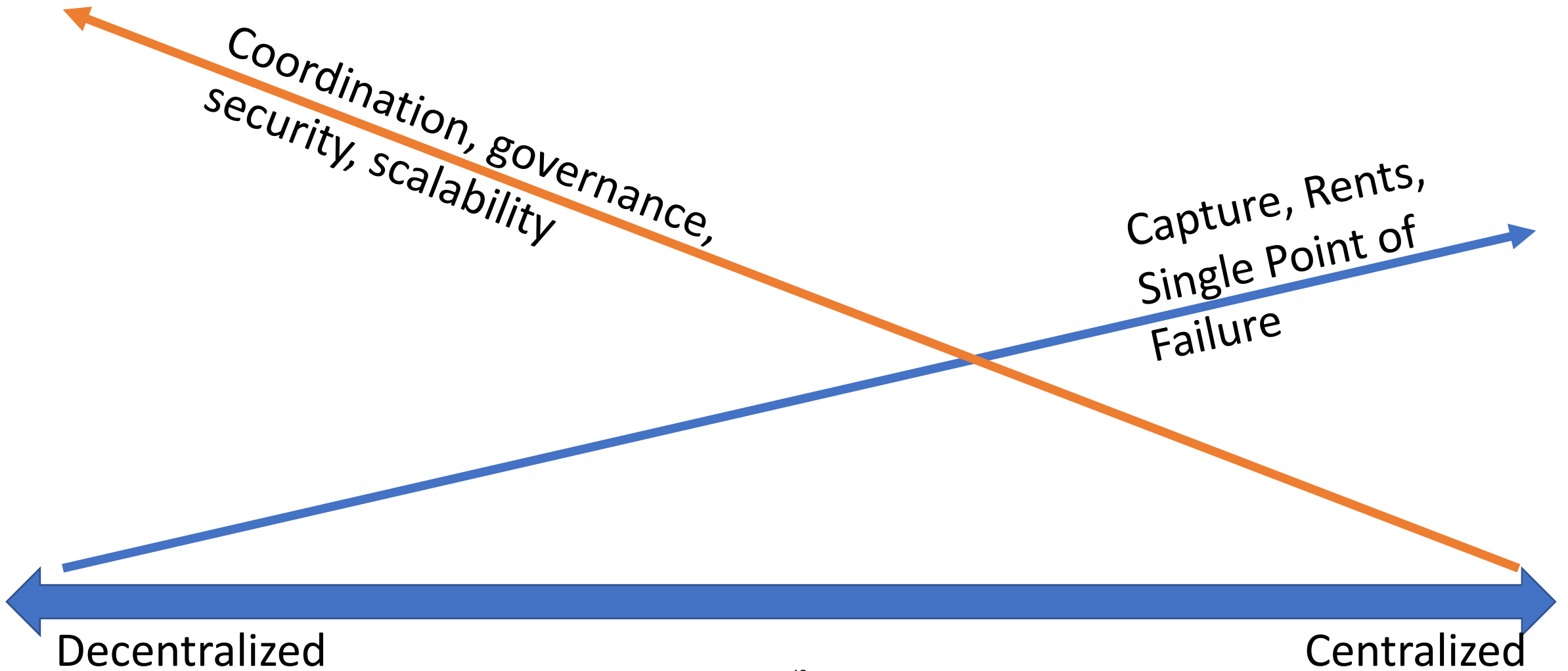
The Minimalists

- High Mining & Transactions Costs Inherent to Design
- Many Technical Challenges
 - Scalability, Performance, Privacy, Security, Interoperability & Governance
- Tokens Lack Intrinsic Value
- Volatility of Token Prices - Poor Store of Value
- Limited Adoption as a Medium of Exchange or Unit of Account
- Not accepted for Taxes or as Legal Tender - No 'Tether'
- Having Multiple Currencies Counter to Economic History and Logic
- Token Monetary Policy in Code subject to Consensus Changes with no Central Bank

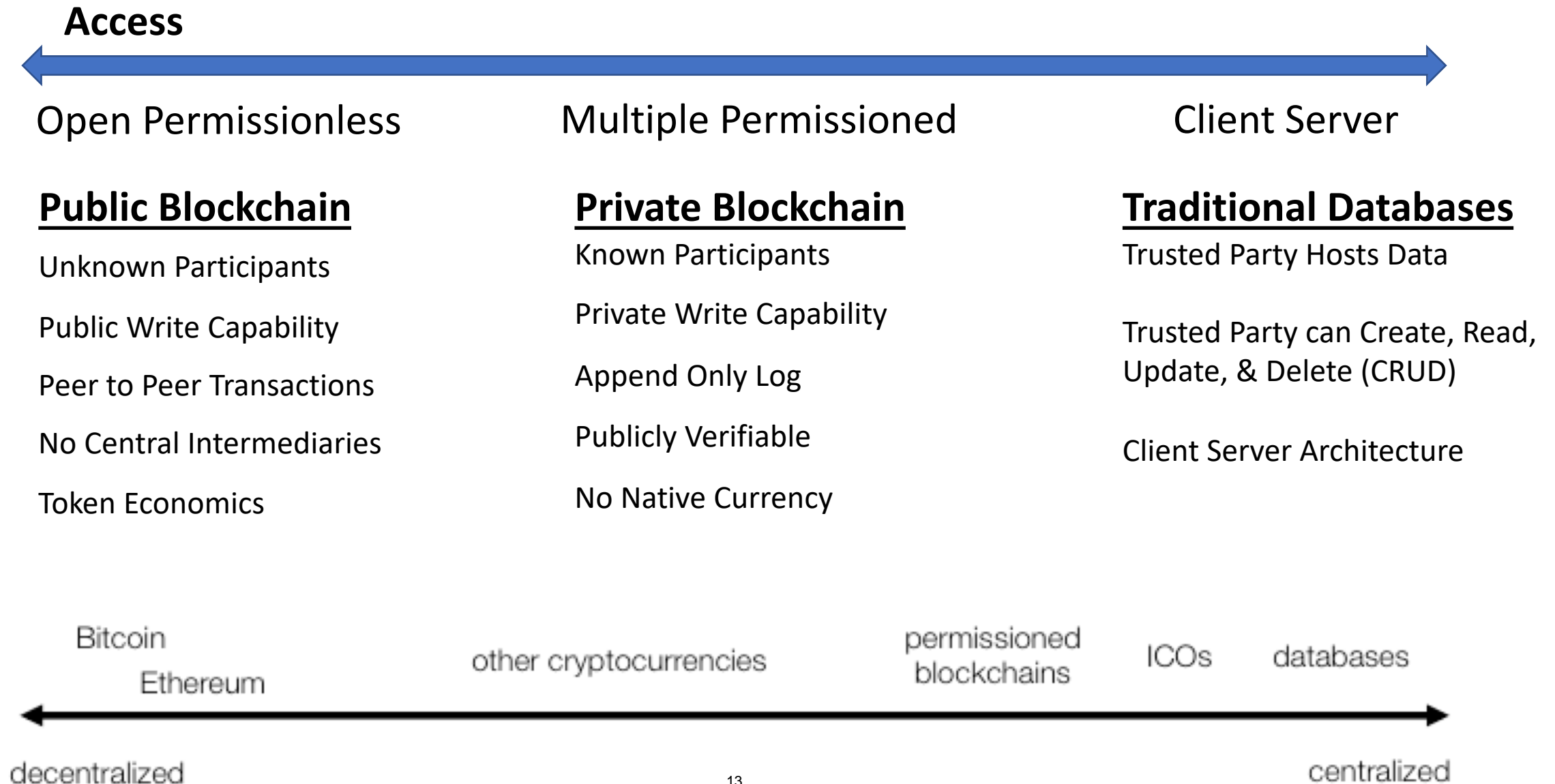
The Minimalists

- Blockchain Applications tend towards Centralization
 - Mining Pools, Crypto Exchanges, Software Development, Holders & Alternative Consensus Protocols
- If Private Key is Lost or Stolen it is gone Forever
- Buterin's Trilemma – Decentralization, Scalability and Security
- Doubt Claims of benefits of Token Economics
- No 'Killer App' or Production Use Enterprise App yet
- Scams, Frauds, & Manipulation on Crypto Exchanges and with ICOs
- Illicit Activities – Tax Avoidance, Drug Running, Money Laundering

Framework for Comparing Costs & Trade-offs



Blockchains and Traditional Databases



Blockchain Economics

- Can Lower Verification Costs:
 - Direct Costs
 - Privacy Costs
 - Censorship Risks
 - Settlement and Finality Risks
 - Costs of Trust
 - Economic Rents
- Network Incentive System:
 - Reward, Affinity and Identity
 - Starting or Operating

Class 12 (10/18): Study Questions

- What potential benefits – in terms of reducing costs of trust – are there when adopting blockchain technology applications? How might potential use cases be assessed for the trade-offs of decentralized vs. centralized applications?
- What are the potential strategic benefits from blockchain applications? What are the attributes of potential use cases and sectors that might best capture value from such applications? How important are the benefits of censorship resistance to this analysis?
- How can you separate rigorous analysis from mere assertion and hype in the blockchain ecosystem?

Class 12 (10/18): Readings

- *'Geneva Report'* Chapter 2 & 3 (4-30), Chapter 5 (51-55) Casey, Crane, Gensler, Johnson, and Narula
- *'Blockchain beyond the hype: What is the strategic business value?'* McKinsey
- *'A Letter to Jamie Dimon'* Chain
- *'The promise of the blockchain technology'* Economist

Conclusions

- Blockchain Technology addresses Costs of
 - Verification
 - Networking
- Minimalists, though, Highlight Many Economic and Technical Concerns
- There are Valid Trade-Offs Between Blockchain Technology and Traditional Data Bases
- Over Time, as Many Challenges are addressed, Blockchain Technology has a Potential to be a greater Catalyst for Change



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15.S12 Blockchain and Money
Fall 2018

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