

Blockchain & Money



Class 14

November 1, 2018

Class 14 Overview

- Readings and Study Questions
- 10 Years and Counting – Happy Anniversary
- Payment Systems and ‘Pain Points’
- Payment System & Blockchain Technology
- Blockchain Payment Companies
- Conclusions

Class 14 (11/1): Study Questions

- What lessons can be drawn from the challenges for blockchain related payment applications? Might Layer 2 solutions, such as Lightning, resolve these challenges?
- What are the opportunities in cross-border payments? In domestic P2P or P2B payments?
- What are tradeoffs of utilizing permissioned vs. permissionless payment applications?

Class 14 (11/1): Readings

- *'How Blockchain Can Finally Fulfill its Promise in global Payments'* CoinDesk
- *'Extending the World of Payments to Blockchain'* ACI Worldwide
- *'The Payment Industry is About to be Struck by Lightning: Expert Take'* Coin Telegraph
- *'Why Stripe Gave up on Bitcoin and Blockchain Payments'* Fortune
- *'How XRP Fits into Ripple's Payment Products Explained'* CoinDesk

Satoshi Nakamoto: Bitcoin P2P e-cash paper

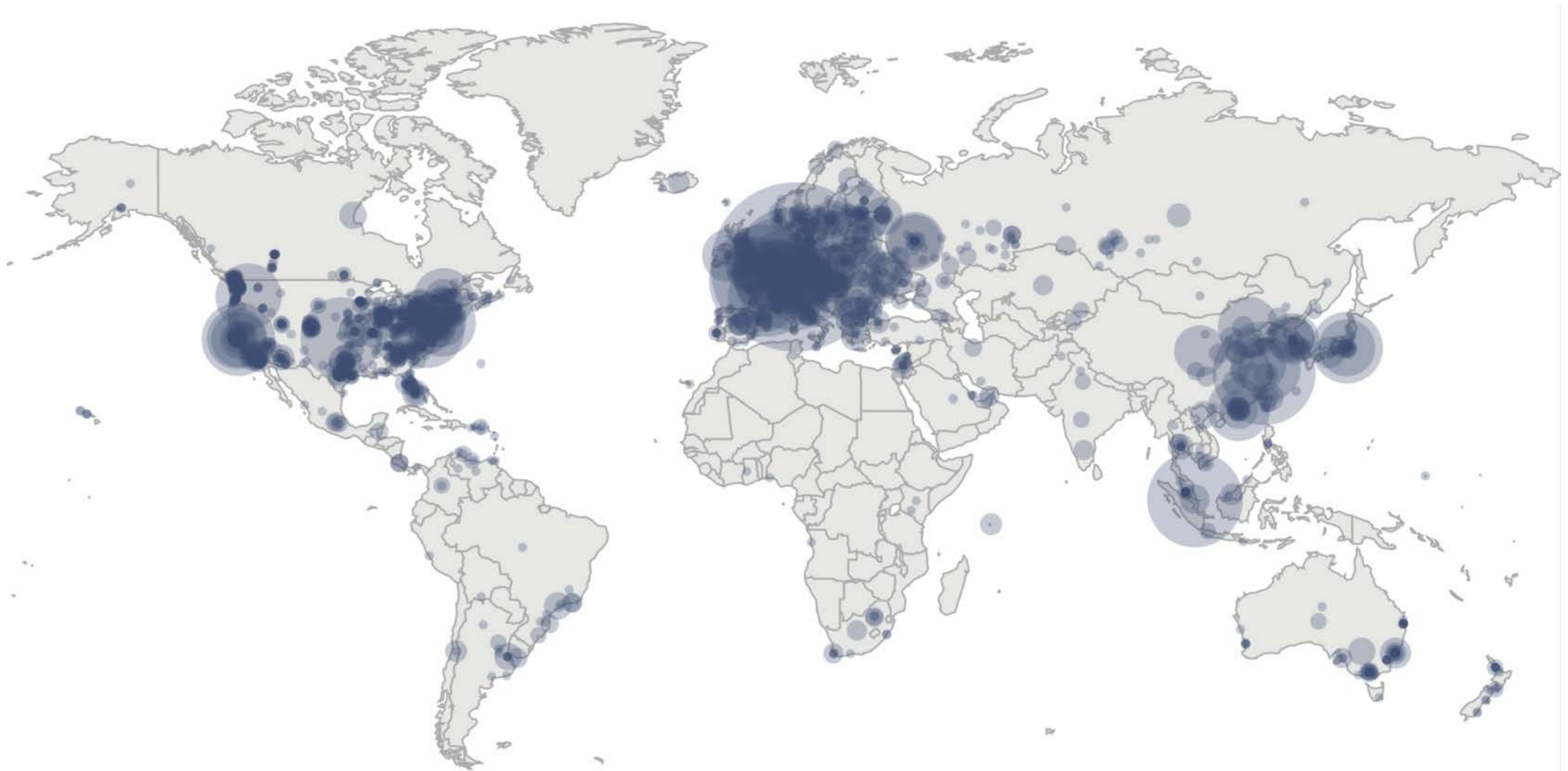
October 31, 2008

“I've been working on a new electronic cash system that's fully peer-to-peer, with no trusted third party.”

Bitcoin Anniversary

- Price: \$6300
- Market Capitalization: \$110 Billion
- Outstanding Supply: 17,352,000
- Blocks: 548,300
- Blockchain Size: 189 GB
- Transactions per Day: 250,000
- Hash Rate: 50 Exahash (10^{18})/Sec
- Difficulty: 7.2 Trillion
- Unique Addresses: 500,000

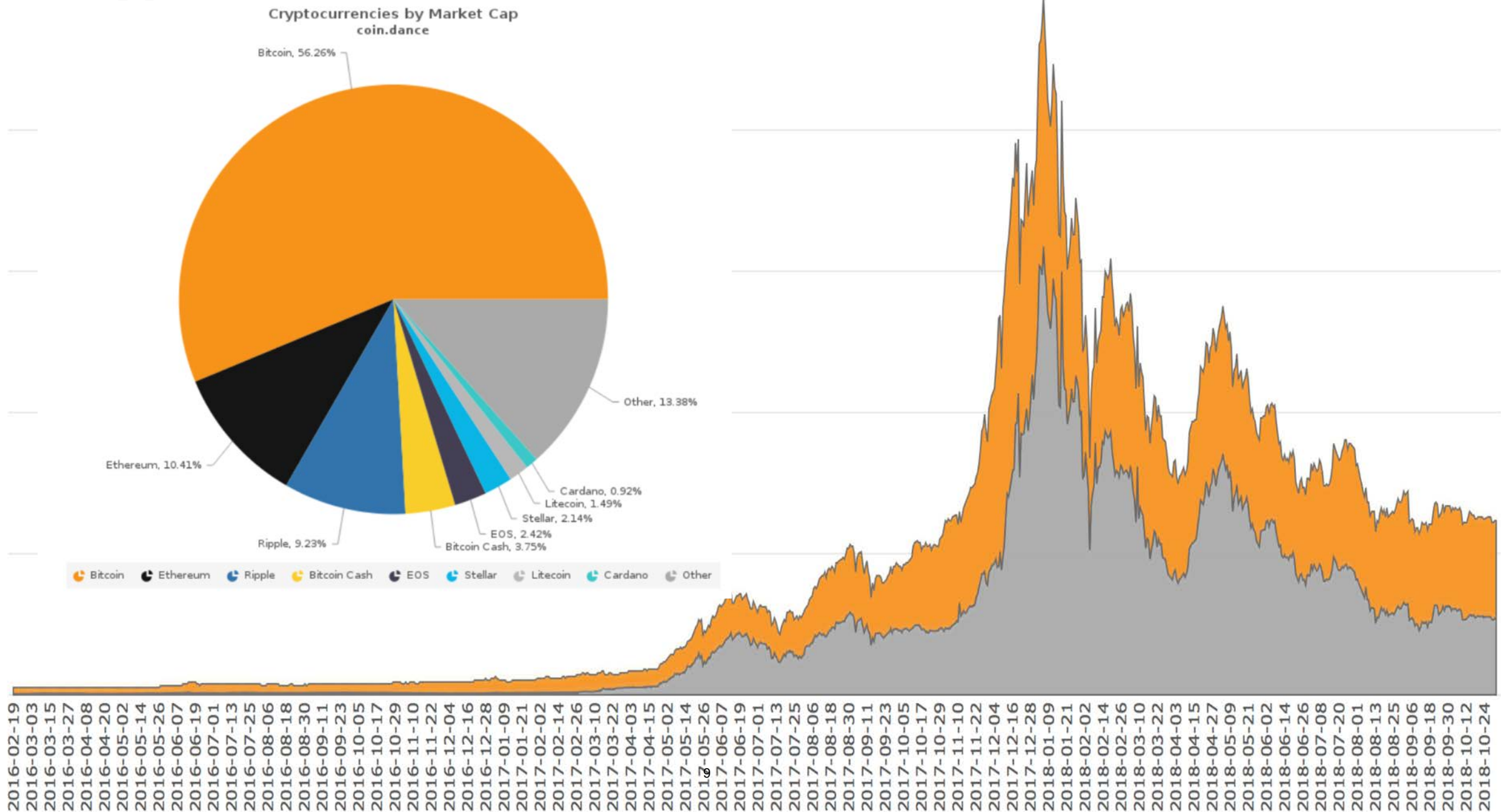
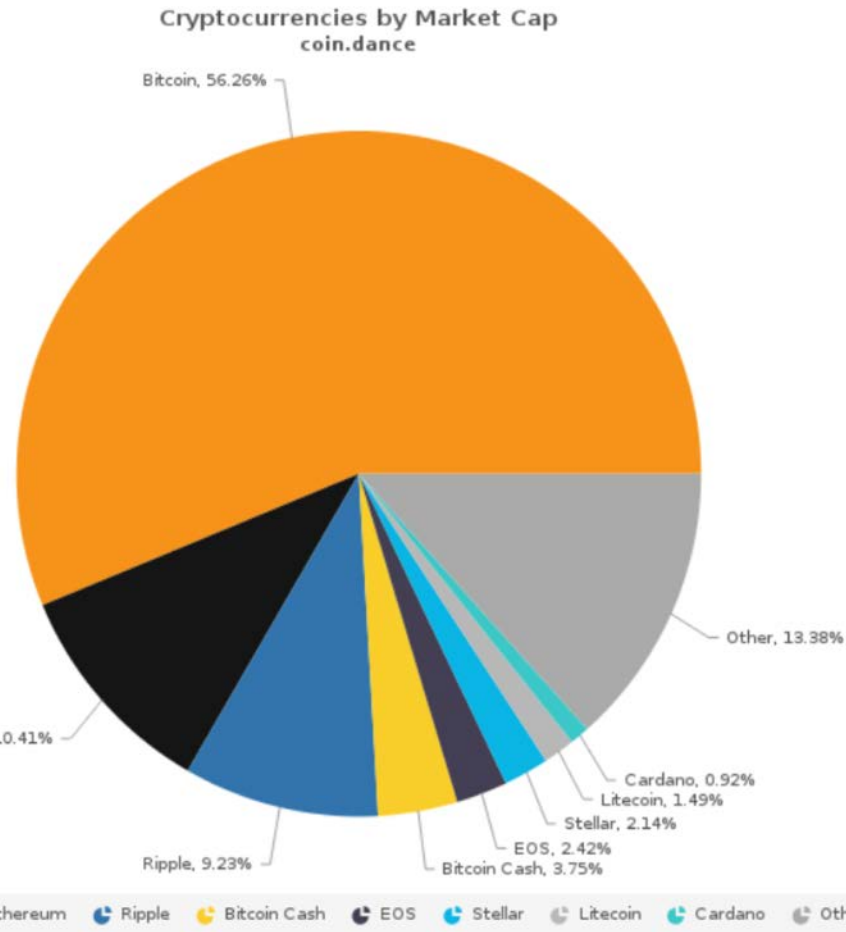
Bitcoin Network: 10000 Nodes



Courtesy of Addy Yeow at Bitnodes. Used with permission.

Crypto Finance

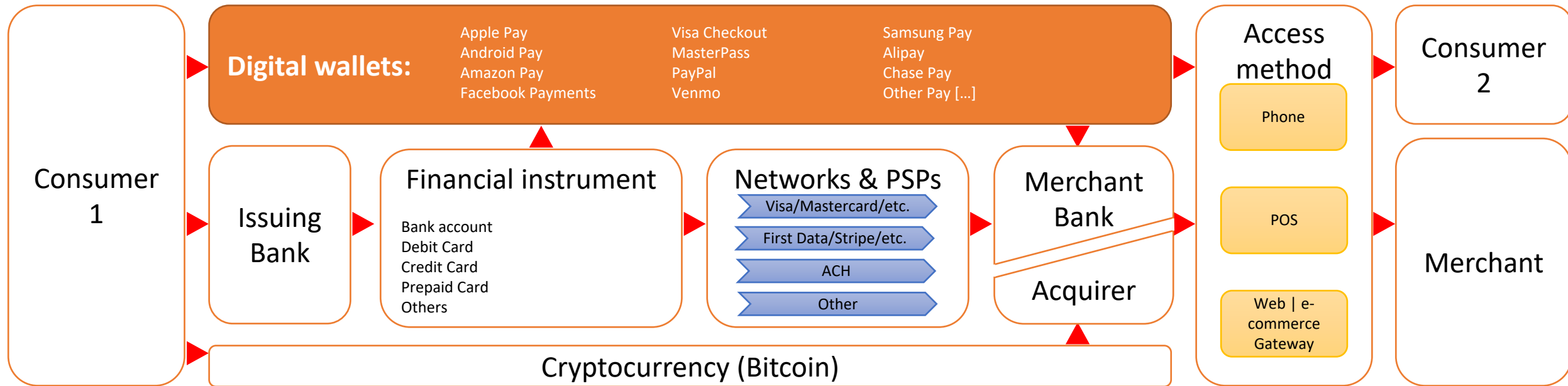
\$800,000M
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2018-10-12
2018-10-24

Payment Systems

A Method to Amend and Record Entries on Ledgers for Money
Authorizing, Clearing and Recording Final Settlement



Payment System 'Pain Points'

- Costs
- Delayed Settlement
- Chargebacks
- Fraud
- Privacy
- Financial Inclusion
- Cross Border Payments
- Centralization of Ledgers
- Complexity

Benefits of Blockchain Technology

- Verification Costs:
 - Direct Costs
 - Privacy Costs
 - Censorship Risks
 - Settlement and Finality Risks
 - Costs of Trust
 - Economic Rents
- Networking Costs:
 - Token Incentive Systems - Reward, Affinity or Identity
 - Start-up Costs
 - Operating Costs

Payment System & Blockchain Technology?

- Possible Suitability
 - Payment Systems use Ledgers to Store and Move Value
 - Multiple Parties Read and Write to these Ledgers
 - Verification and Networking critical to Payment Systems
 - Tokens Store Value
 - Peer to Peer Capabilities
 - Micro Payments

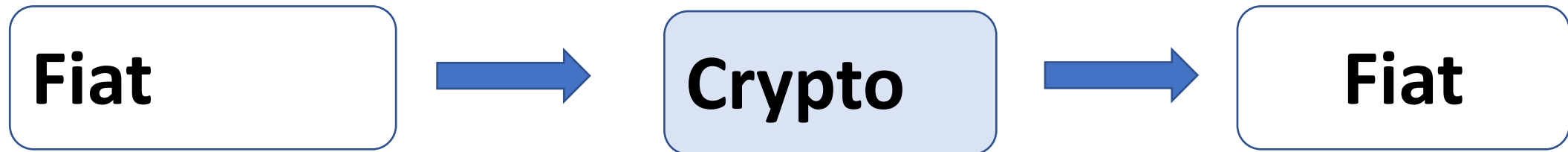
Payment System & Blockchain Technology?

- Challenges
 - Performance, Scalability & Latency
 - Security, Custody & Privacy
 - Regulatory Compliance
 - Customer User Interface
 - Adoption
 - Token Volatility

Blockchain Technology Payment Companies

- Crypto – Start-Ups
 - BitPay
 - Coinbase
- Fiat – Start-Ups
 - Chain
 - Interbank Information Network (built on Quorum)
 - R3
 - Ripple
- Incumbents
 - ICE's start-up Bakkt
 - MasterCard Patent for Crypto Fractional Banking
 - Visa B2B Connect

Possible Use of Bridge Crypto for Payments



Class 15 (11/6): Study Questions

- What strategic considerations should go into Central Banks thinking of expanding access to digital reserves through central bank digital currency (CBDC)?
- How might design considerations – retail vs wholesale access; token or account based; interest bearing and level of service – weigh in such decisions?
- What are the challenges CBDCs might pose to commercial banking models, monetary policy implementation, payment systems resilience and financial stability?

Class 15 (11/6): Readings

- *'Central Bank Digital Currencies'* BIS
- *'The Future of Money: Digital Currency'* Garratt
- *'Central Banks and Digital Currencies'* Broadbent
- *'A Perspective on electronic alternatives to traditional currencies'* Camera
- *'Bitcoin is Fiat Money, Too'* Economist

Conclusions



- Payment Systems Amend and Record Ledgers for Money
- Technology is Rapidly Changing Payment Systems around the Globe
- Payment Systems have Many ‘Pain Points’
- Blockchain Technology may Provide new Methods to Make Payments
- Due to Challenges, though, No Widely used Blockchain Payment Apps
- In Assessing Potential Use Cases the Devil will be in the Details

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