

Can eCash & Virtual Currency Compete with Other Electronic Payments?

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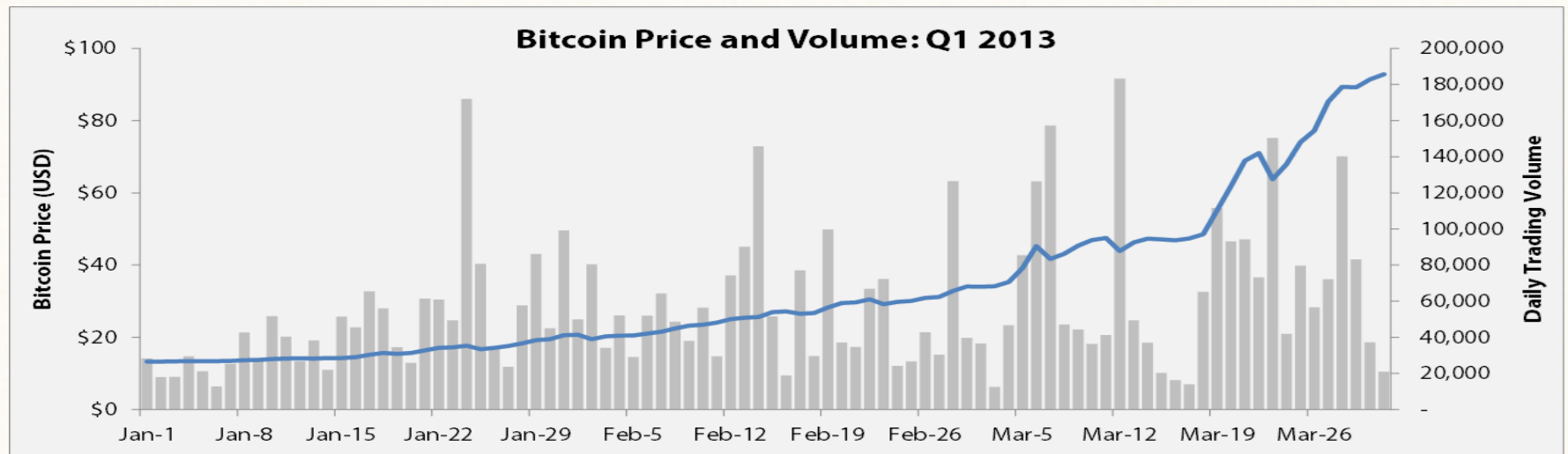
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The views expressed in this presentation are those of the presenters and do not necessarily represent the views of the Federal Reserve Bank of Boston or the Federal Reserve System.

Why is there so much interest in e-cash and virtual currency?

- Most alternatives to notes and coins are costly (interchange fees on debit and credit cards; usage fees on prepaid cards)
- Notes and coins have **unique characteristics** that consumers desire (anonymity, accessibility, no direct transaction fees, immediate settlement, no debt):
Are there virtual or portable electronic devices that also have these properties?
- Internet access, reliability, and speeds are rising; encryption improvements
- The explosion of mobile devices with significant processing power
- Bailout (or non-bailout) of failing banks during crises (March 2013 Cyprus crisis)



What is cash?

Cash may have several characteristics such as:

- Physical aspect (notes and coins versus digital)
- Liability and backing:
Sovereign government (outside money) versus private money (inside money)
- Asset value



Purposes and functions of cash (the commonly-used textbook explanation):

- Medium of exchange (our primary focus today)
- Store of value
- Unit of account

Medium of exchange

- Trading parties must agree on a common medium of exchange
- An increase in a medium's popularity is referred to as “network effects”
- Radford (*Economica*, 1945) describes how cigarettes served as a medium of exchange in a POW camp during WW2
- Radford noted that even after the Red Cross distributed dollars, cigarettes (commodity money) remained the dominating medium of exchange
- So, how would you like to trade today?

With



Or



?

Why do people hold a particular (or any) *Fiat* currency ? (the most difficult question in monetary economics)

Why is it such a difficult question?

- In 1971, President Richard Nixon officially took the U.S. off the gold standard:
\$1 today can buy only 1/6 of the gold it could buy in 1971
- We use *fiat* (“it shall be” in Latin) money
- “Legal tender” does not guarantee that a currency can maintain its value relative to goods, services, or other currencies (may even not guarantee trade)



Four (out of many) common incomplete explanations include:

- Governments accept tax payments only in that country’s fiat currency
For example: Form **1040** must be filed in \$ (not Euro and not Bitcoin)
- Implicit or explicit (legal tender) social norm (but could be unstable), i.e., both parties accept it
- Hedge against other currencies (exchange-rate fluctuations)
- Hedge against alternative payment options not being accepted / available



Elaborating on: "Alternative Payment Options Not Acceptable"

Economic theory suggests that

the introduction of *fiat* money could be welfare improving because it solves the "double coincidence of wants" problem (avoid missing trading opportunities because the parties cannot agree on a common medium of exchange)

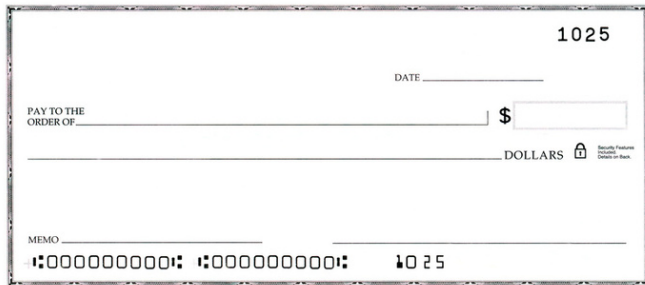


pay with Square



"I need your service."

"...and I need YOUR service!"



Will virtual cash replace physical cash? (It's partly a chicken and egg question)

- To replace physical cash, would-be alternatives must replicate (ideally, improve on) the features that make it attractive to users, including, particularly, its ubiquity
- Ubiquity is the result of what economists call “network effects”; here are a few formal definitions:
 - Technologies are said to be *compatible* if they can “work together,” in which case we say that they adhere to the same *standard*
 - Network effects are the benefits users derive from an increase in the number of other consumers and/or merchants who adopt the same (or a compatible) standard
- Of course, this begs the question of what gives rise to positive network effects and a successful alternative to cash...

Two types of digital money: E-cash vs. virtual currency*

E-cash

- Denominated in fiat currency
- Fully exchangeable for fiat currency on 1:1 basis
- Examples: Mondex-Visa, MintChip

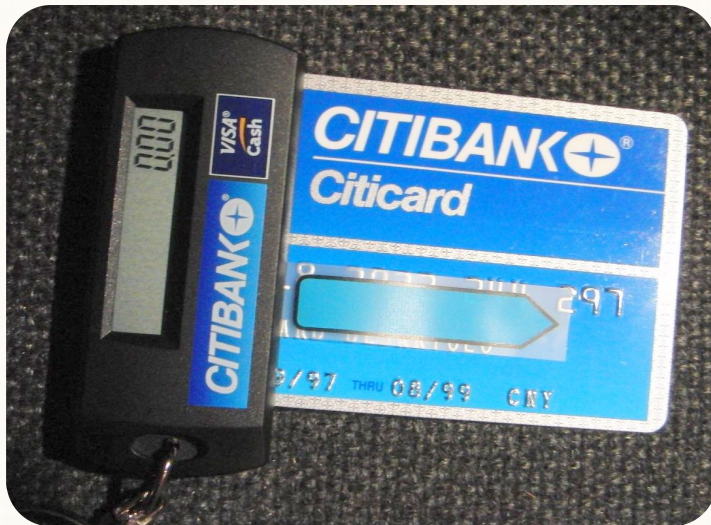
Virtual currencies (VC)

- Denominated in their own unit of account
- May or may not be exchangeable to fiat currency; if exchangeable, typically at variable exchange rates
- Examples: Bitcoin, Facebook Credits, Linden Dollars

* *Note:* There is no agreement on how to define “e-cash” and “virtual currency”; these classifications are mine and for this presentation

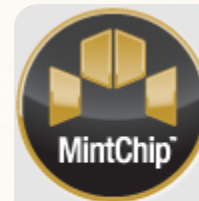
E-cash: the Mondex and Visa Cash experiments

- In the late 1990s developers envisioned anonymous e-cash
- Dec. 31, 1998: End of a 15-month experiment in NYC by Mondex & Visa Cash
- Chase and Citi distributed the cards with a loading capacity of up to \$500 at ATMs
- 675 merchants received free terminals, 96,000 cards were issued (Upper W. Side)
- Some foreign cities participated in the UK, Israel
- The experiment ended because of below-expectation adoption rates



E-cash and government initiatives: the Royal Canadian Mint Project

- MintChip was initiated in 2012 by the Royal Canadian Mint
- The private sector was invited to develop all forms of apps
- The MintChip could be attached SD cards and other mobile formats
- The balance (dollars) is on the card (therefore, “true” e-cash)
- The card contains a private key signed by the Mint
- E-cash properties: theft-proof (but not loss-proof, just like notes and coins)



The Royal Canadian Mint presents
The MintChip Challenge

Winners announced ([view all dates](#))

 **\$52,700** in prizes

Virtual Currency:



- “Open source” money: Anyone (governments included) can copy and use the software to create her/his own virtual currency (since 2009)
- Security is also open source and openly discussed
- The value fluctuates sharply probably because of the low trading volume
- “Mining” designed to reward individuals for connecting high-performance servers
- International as the Internet (like a social network)
- Long-term cap on the money supply: 21 million bitcoins
- Currently, about 12 million “in circulation”
- Divisible to the 8th digit (for small transactions)
- 2013/11: First ATM (Canada)



Bitcoin Network

Economy

Total BTC	11,957,225 BTC
Market Cap based on latest prices	2,977,349,025 USD or 2,282,873,397 EUR or 9,184,344,523 PLN or 1,984,839,564 GBP
Transactions last 24h	55,051
Transactions avg. per hour	2293.79
Bitcoins sent last 24h	940,546.34 BTC
Bitcoins sent avg. per hour	39,189.43 BTC

More on virtual currencies (VC)

- There are at least 150 virtual currencies, not backed by any government, including, for example, social networks (Facebook credit), games (Linden dollars in Second Life)
- Longstanding Federal Reserve position on virtual currency: regulators should be careful not to inhibit experimentation and growth of innovative payment technologies, but consumer protection and transparency about how the innovation operates will be key to successful adoption
- FinCEN may require registration as a Money Service Business (MSB) for convertible VC (in addition to state-by-state money transmitter registration)
- ECB concluded that VC will not impact price stability (still too small)
- Europe, UK, and China currently do not regulate VC

Buy L\$

L\$ are used in Second Life to purchase virtual goods and services like a new shirt or hair, attend events, play games and more. How many Linden Dollars (L\$) would you like to purchase?

Linden Dollars (L\$)	US Dollars (US\$)
<input type="text" value="2470"/>	<input type="text" value="10"/>

Your Current Balances

L\$ 0
US\$ 0.00

Purchasing	L\$ 2,470
Estimated Cost	US\$ 10.00
Transaction Fee	US\$ 0.30
Estimated Total	US\$ 10.30

[Place Order](#)



Assessing the likelihood of positive network effects: a few considerations

How well do the e-cash and virtual currency options replicate / improve on some of cash's attributes?

- Anonymity:
 - Bitcoin designed to be decentralized and anonymous
 - E-cash options can be designed without reference to central account (e.g., MintChip)
- Confidence in maintenance of value (credit risk):
 - Bitcoin designed to limit supply
 - Other models depend on creditworthiness of issuer
- Ease of use / acceptance:
 - May depend on convertibility to fiat currency, as well as technology that must be deployed by users
 - Typically better than cash for digital transactions
 - Regulation / taxation (or lack of clarity about regulation / taxation) can affect acceptance

Summary

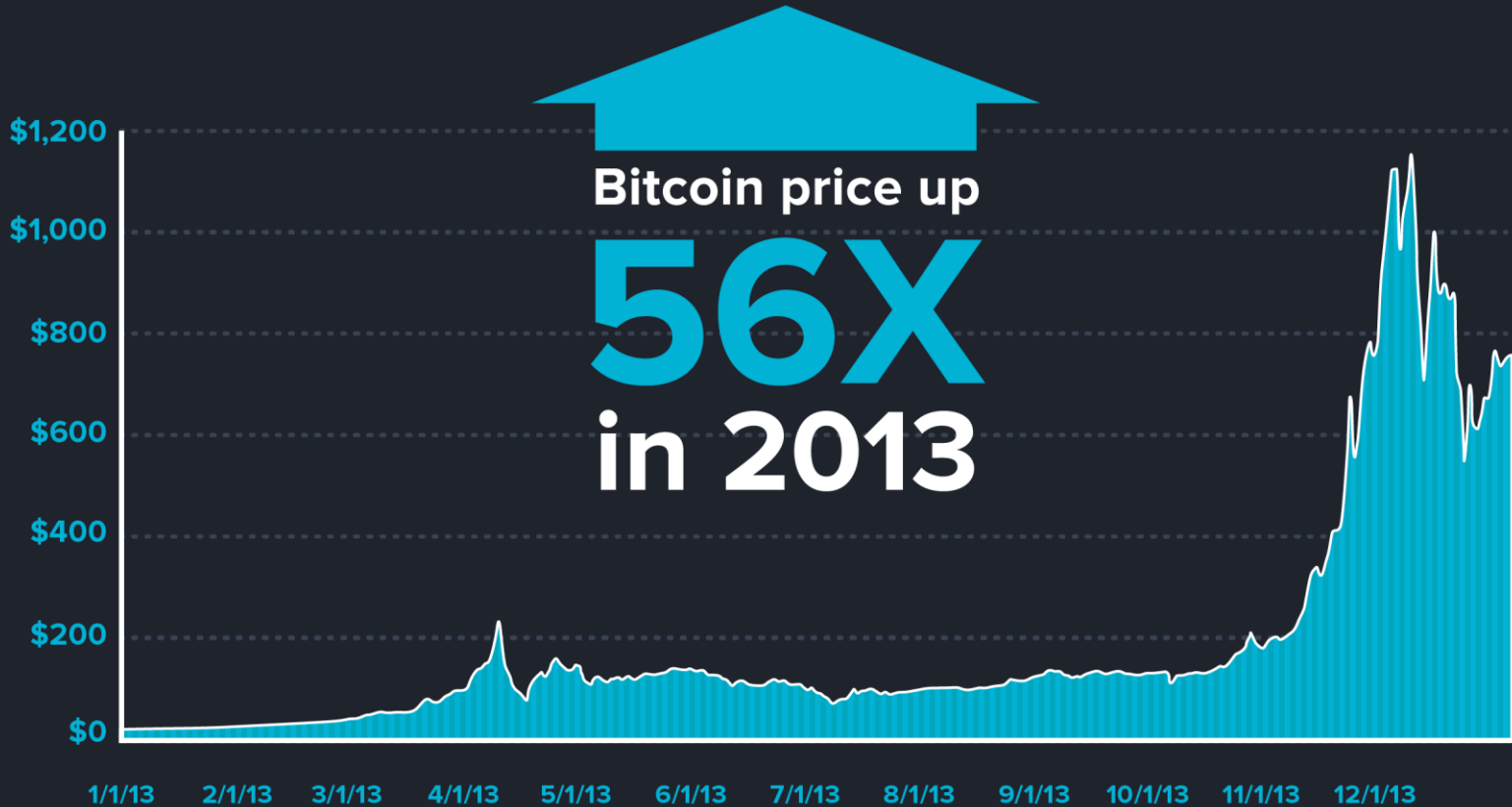
- E-cash that failed in the late 1990s may have a comeback because of (i) falling cost, (ii) improved encryption, (iii) increased Internet commerce, (iv) explosion of mobile devices
- In addition, government backing, as in the case of the Mintchip, could be a spur to adoption
- Virtual currencies are not backed by governments, but their convertibility may require regulators to pay attention if they reach high volumes



NACHA PRESENTATION

April 8, 2014 | Orlando, Florida

The largest annual asset price appreciation in history

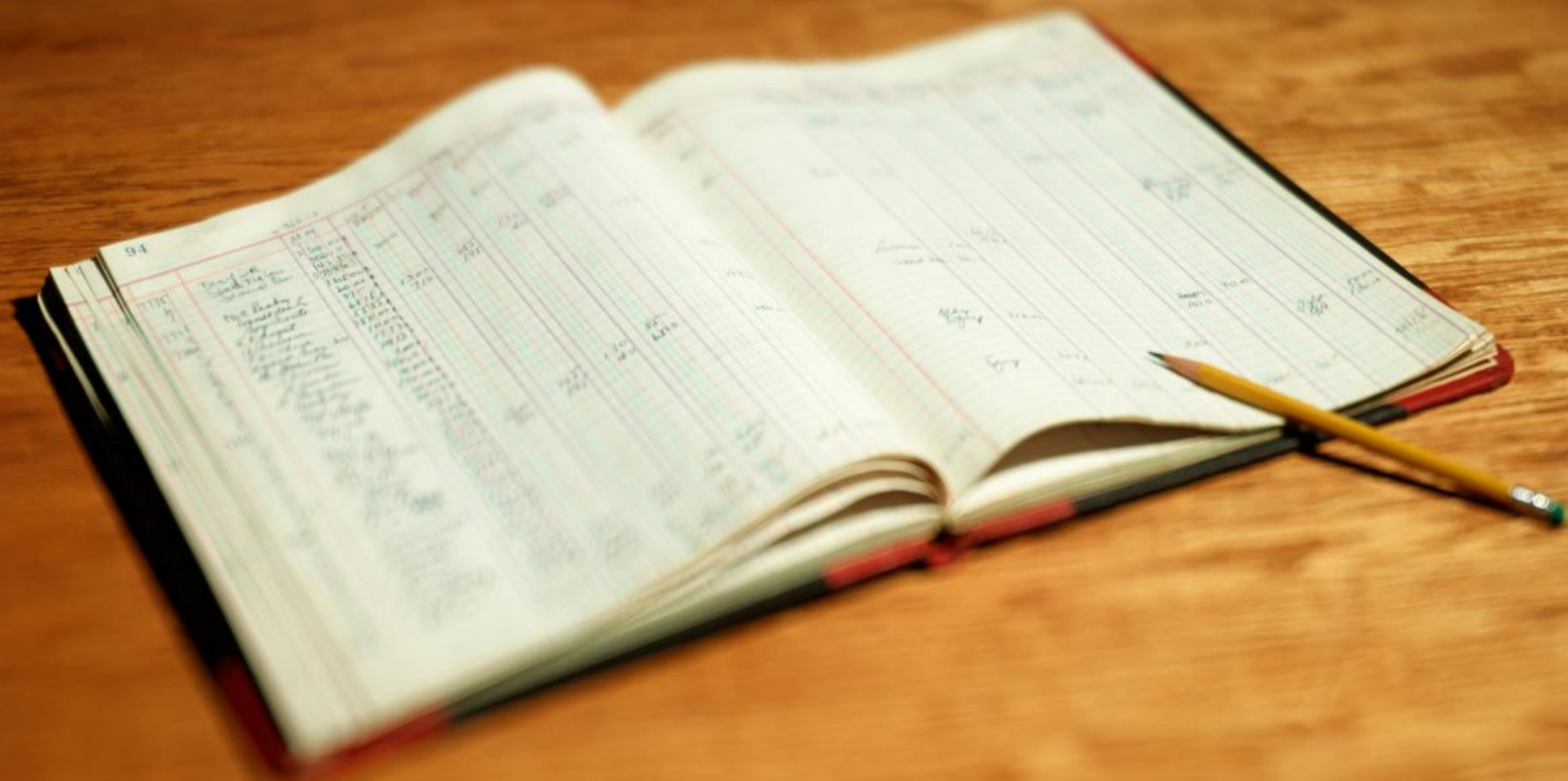




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- **Free** and instant communications (SMTP, SMS)
 - **Free** publishing of content (HTTP, HTML)
 - **Free** media distribution (Youtube, Facebook)
 - **Free** voice and video communications (VOIP, Skype, Hangouts)
 - **Free** access to global knowledge and information (HTTP, HTML)

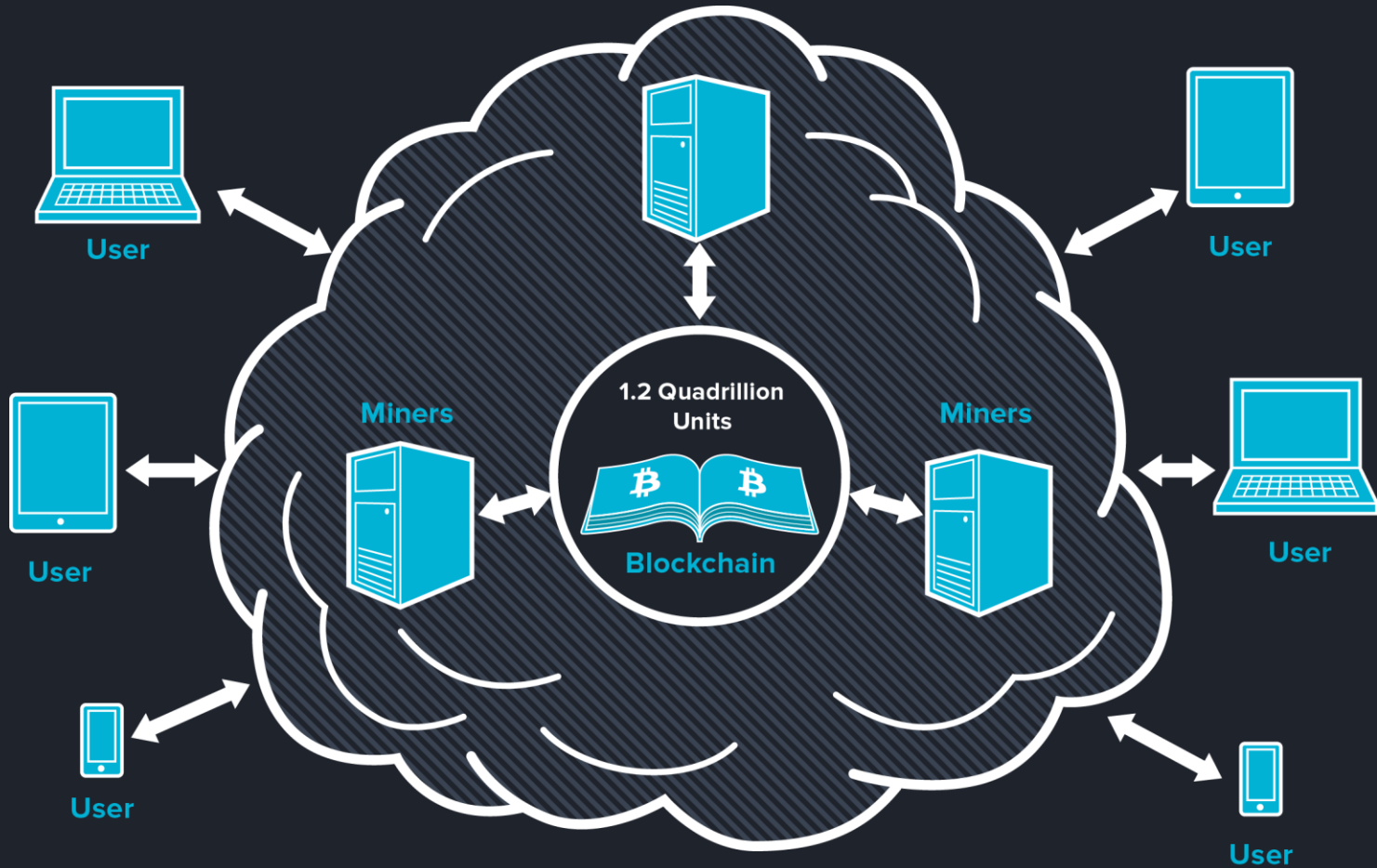




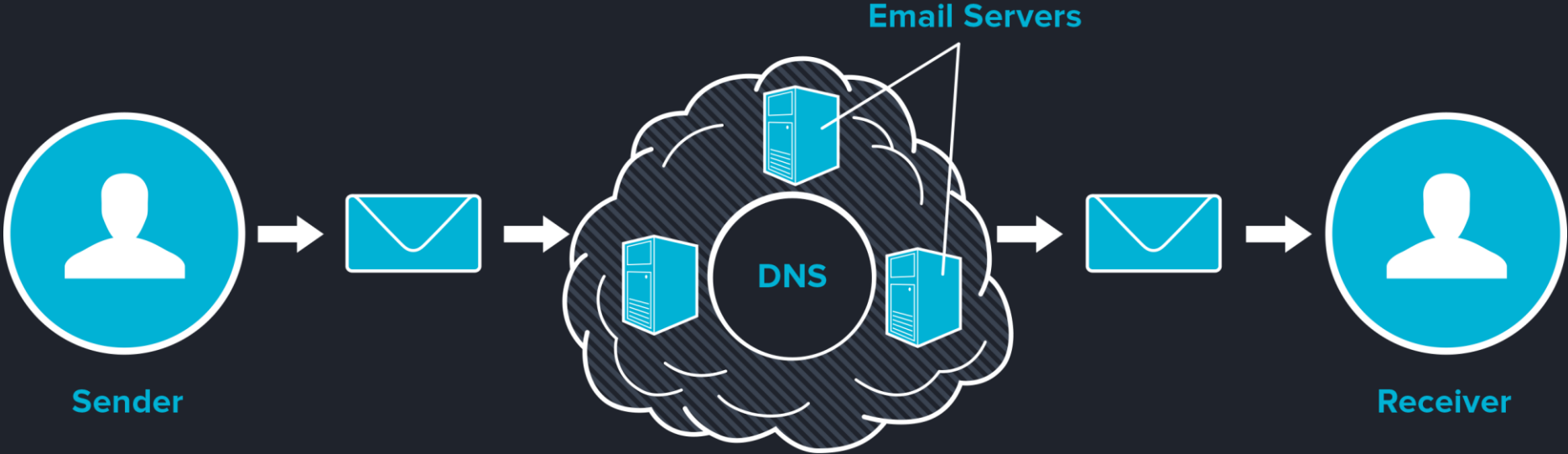


DATE	DESCRIPTION	AMOUNT	BALANCE
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1/5/20
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1/9/20
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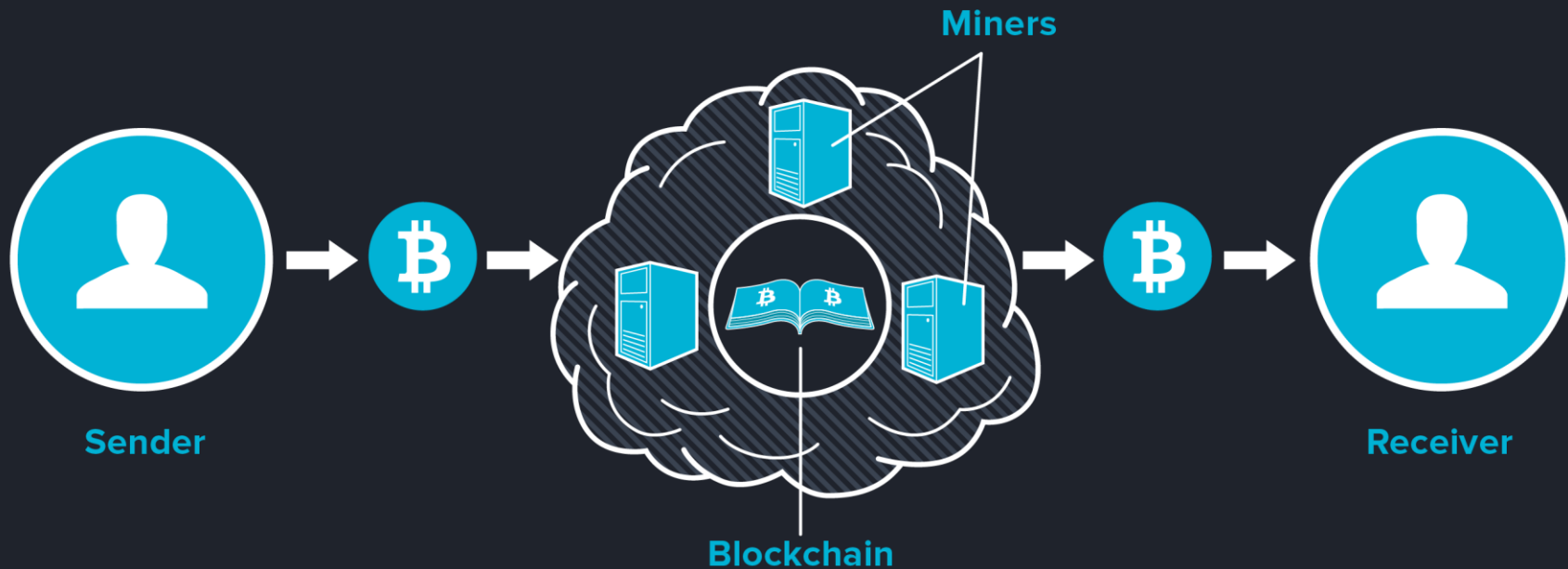
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Email Transaction

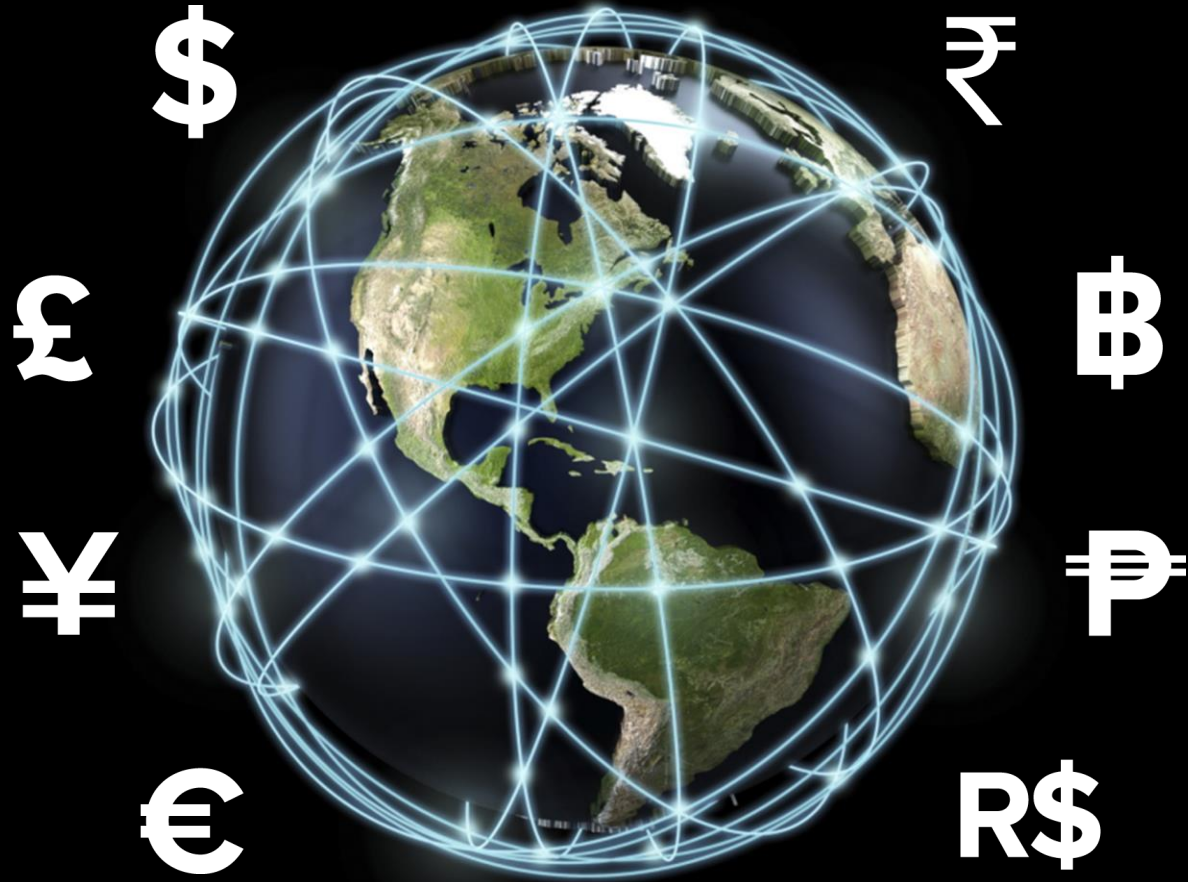


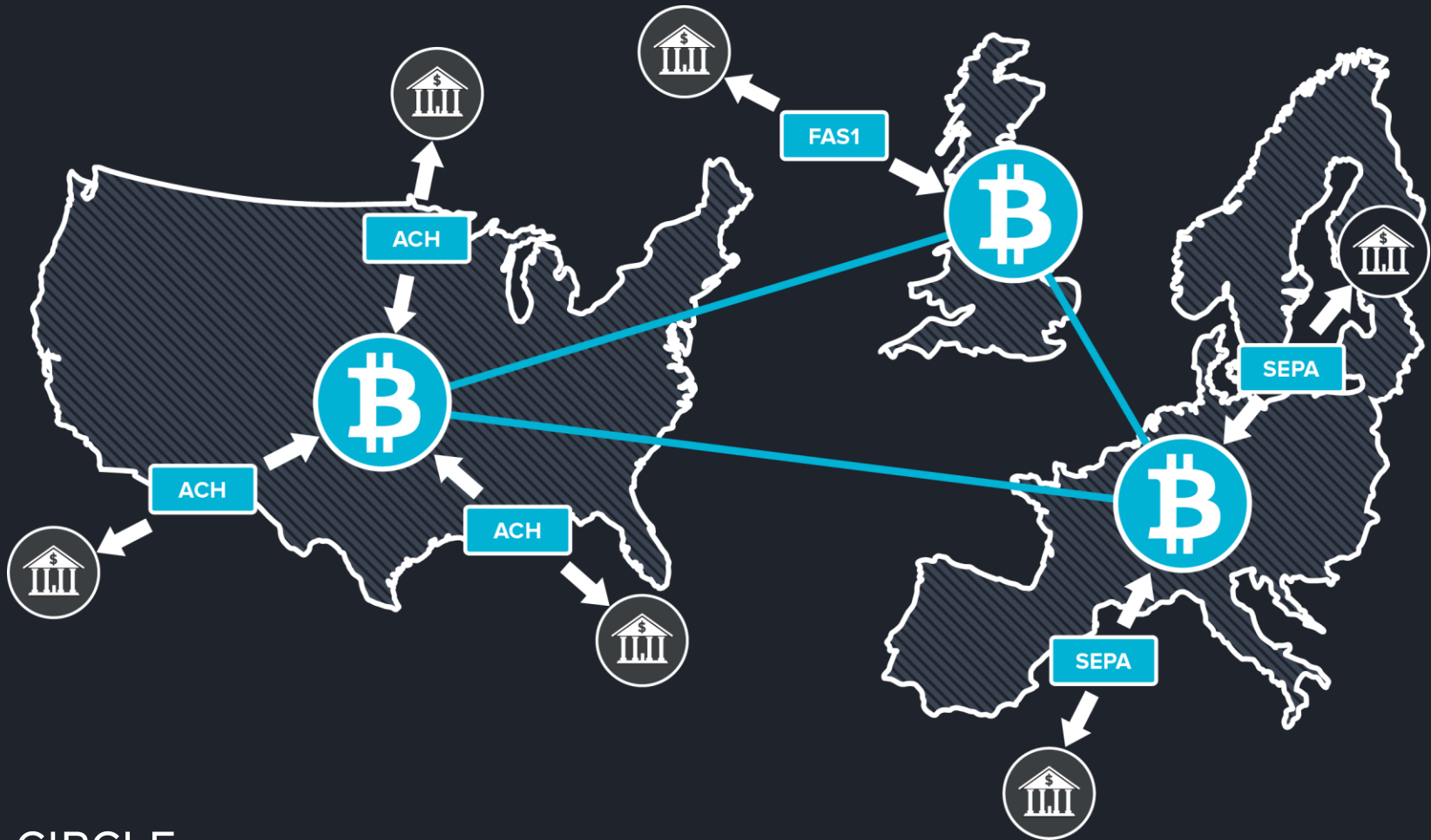
Bitcoin Transaction













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PAYMENTS 2014

Orlando, FL

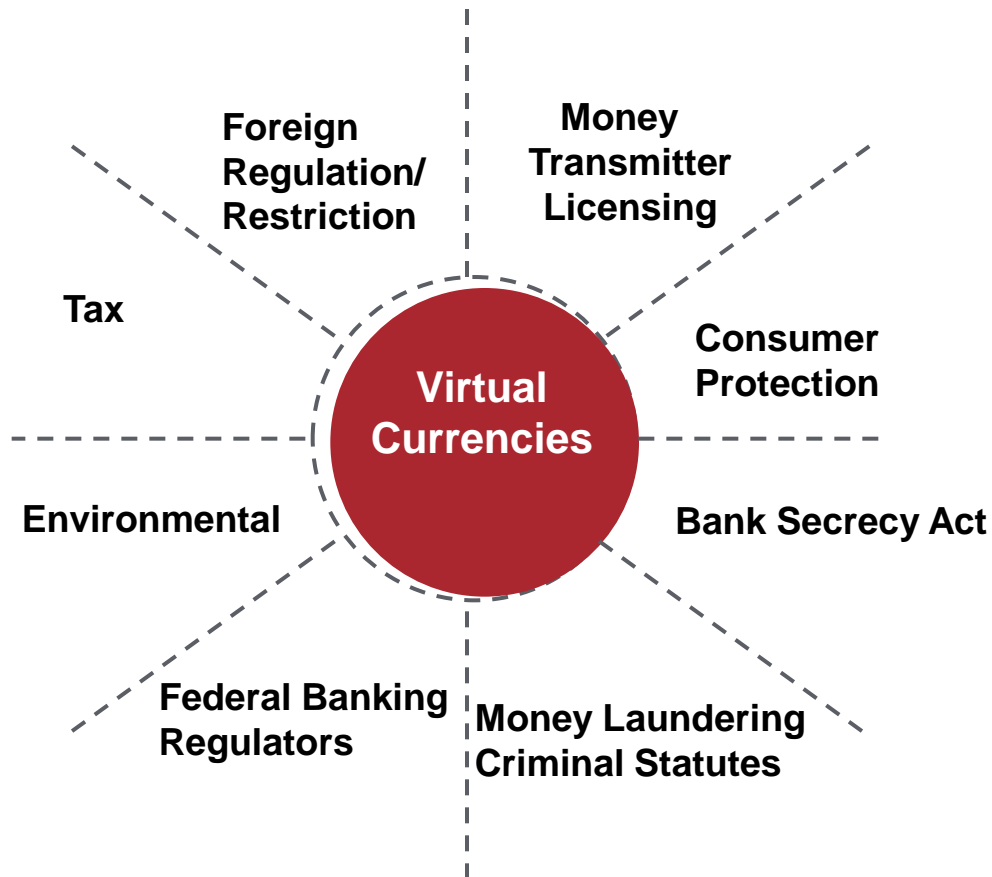
April 8, 2014

Carol R. Van Cleef

Legal and Regulatory Challenges

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- **The Myths**
- **The Truths**
- **The Grey Areas**
- **The Crystal Ball**



- **Money Transmitter Licenses**
- **Money Services Business Registration**
- **BSA recordkeeping and reporting**
- **Property for tax purposes**
- **Carbon footprint**

- **It's not "real" money**
- **It's illegal**
- **It's just a ponzi scheme**
- **It's used only in illegal transactions**
- **It's anonymous**
- **It's not regulated**
- **It's only bitcoin/crypto-currencies**
- **Other countries don't care**

- **FinCEN Guidance on Convertible Virtual Currency (CVC)**
 - FinCEN Guidance, FIN-2013-G001, Application of FinCEN’s Regulations to Persons Administering, Exchanging, or Using Virtual Currencies (March 18, 2014)
- **IRS Ruling**
 - I.R.S. Notice 2014-21, 2014 WL 1224474 (March 26, 2014)
- **Magistrate Ruling**
 - Memorandum Opinion Regarding the Court’s Subject Matter Jurisdiction, SEC v. Shavers, No. 4:13-cv-00416-RC-ALM, (E.D. Texas August 6, 2013), ECF No. 23
- **NY DFS**
 - Order Pursuant to New York Banking Law §§ 2-b, 24, 32, 102-a, and 4001-b and Financial Services Law §§ 301(c) and 302(a), In the Matter of Virtual Currency Exchanges, New York Department of Financial Services (March 11, 2014)
- **Texas Rule**
 - Supervisory Mem. - 1037 from Charles G. Cooper, Banking Comm’r, Texas Dep’t of Banking to All Virtual Currency Cos. Operating or Desiring to Operate in Texas (April 3, 2014)
- **States that have issued Bitcoin licenses**
- **Consumer protection notices – SEC and State warnings**
- **Indictments, plea/ deferred prosecution agreements and sentencing memoranda**

- **Historical – enforcement as regulation**
 - **e-gold**
 - **Gold-backed**
 - **Not illegal**
 - **Mt Gox – alleged failure to be Licensed**
 - **Liberty Reserve – allegedly illegal, unlicensed, unregistered**
 - **Silk Road**
 - **Bitcoin not illegal**
 - **Not MSB**
 - **Charlie Shrem**
 - **MSB registration is not enough – compliance with BSA requirements expected**

- **State money transmitter statutes – how and to whom do they apply?**
- **MSB registration – exchanger? miner?**
- **Consumer protection statutes – what applies and how?**
- **Tax - is it really just property?**
- **Banking virtual companies?**
- **Bank multicurrency accounts?**

- Regulation
- Regulatory approval (licenses)
- Bank Acceptance – multicurrency accounts
- Bank Accounts for exchangers and other players
- More clarity
- No looking back

Evolution Always Wins... Superman

For Further Information

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