# Regulating the Blockchain

An in-depth look at the most pressing legal issues facing these technologies.

# Presenters

- **Brian Klein**, *Baker Marquart*
- **Elijah Alper**, *WilmerHale*
- **Dana Syracuse**, *BuckleySandler*
- **Patrick Murck**, *Pillsbury and the Berkman Center for Internet & Society*
- **Reuben Grinberg**, *Davis Polk*
- **Byron Rooney**, *Davis Polk*
- **Peter Van Valkenburgh**, *Coin Center*

# Agenda

- **Peter:** Multi-sig Applications and Consumer Protection.
- **Brian:** 18 USC 1960: The Most Important Criminal Statute You've Never Heard Of
- **Elijah:** BSA Regulation and FinCEN's Choice to Classify all Bitcoin Activities as Money Transmission.
- **Dana:** How Regulatory Issues Differ Between Consumer and Enterprise Business Models.
- **Patrick:** UCC Article 9 and Bitcoin Fungibility
- **Reuben and Byron:** Facilitating Securities Transactions with Blockchain: a Regulatory Case Study.

# When does a company actually "control" virtual currency?

What *are* cryptocurrency transactions?
And how do *multi-sig* and *n-lock* transactions work?

COIN CENTER

Peter Van Valkenburgh

First, forget what you think you know about bitcoin (keys, blockchains etc.).

Here's how a transaction actually works...

Every cryptocurrency transaction is an answer to a previous challenge and the creation of a new challenge.

# These are *NOT* transactions:

Please send five bitcoin to my friend Dana.

Please send address xyA42g00 five bitcoin.

Here are the keys to these five bitcoins.

Every cryptocurrency transaction is an answer to a previous challenge and the creation of a new challenge.

# This *is* a transaction:

This is my proof that I have *the answer (5)* to the *challenge (3+2=?)* which previously locked *bitcoins z*.

} Answer to previous challenge.

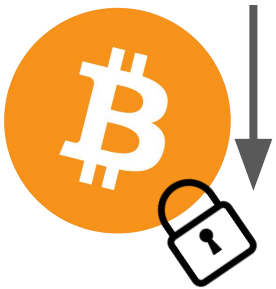
Creation of new challenge. {

Now make *bitcoins z* only spendable by whoever can prove that they have *answer* to new *challenge (2+2=?)*.

# The Cryptocurrency Network Evaluates Answers and (if correct) Records New Challenges.

# Now, whoever can answer the new challenge can spend the bitcoin.

New challenge:
“2+2=?”



**Public Blockchain**

# Instead of a math challenge and answer:

4+4+?  8!

## We can make the challenge use digital signatures (used for authentication online) with matching public-private keys.

What is digital signature of the private key matching this public key (address)?

Digital signature that could only have been made by person with private key!

# This *is* also a transaction:

This is a signature made with private *key x* that matches *address y* which previously locked *bitcoins z*.

} Answer to previous challenge.

Creation of new challenge. {

Now make *bitcoins z* only spendable by person who can sign with private *key a* that matches *address b*.

# If someone else tells you the address that matches their private key, you can send them bitcoins.

Previous Challenge:
"Sign with Key *x* that Matches Address *Y*"

User Answers Challenge:
"Signature of Key *x*"

Can set new challenge:
"Sign with Key *a* that matches Address *b*"

**Public Blockchain**

**User**

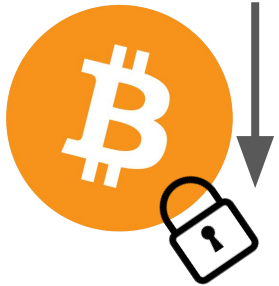
**Public Blockchain**

# Now, whoever can answer the new challenge can spend the bitcoin.

User Answers Challenge:
"Signature of Key *x*"

**User**

Can set new challenge:
"Sign with Key *a* that matches Address *b*"



**Public Blockchain**

**I have key *a*! That means I now control those bitcoins.**

# KEYS ≠ COINS

# KEYS ≠ COINS

**EXAMPLE: keys that had no prior transactions using them as the challenge. These are keys to nothing!**

**KEYS =**

**something that *might* be needed to control coins.**

# What is MULTI-SIG?

# This *is* a multi-sig transaction:

same as before

This is the digital signature of *key x* that matches *address y* which previously locked *bitcoins z*.

} Answer to previous challenge.

Creation of new challenge. {

Now make *bitcoins z* only spendable by person(s) who can sign with two of of the following three keys that match *address b*.

**MULTI-SIG transactions create challenges where *M* of *N* keys are needed to spend bitcoins.**

*15* of *15* keys needed.

*2* of *3* keys needed.

# *M* of *N* ?

*1* of *1* key needed.

*3* of *5* keys needed.


This is a 1 of 9 in *real life*!

# What is N-LOCK?

# This *is* an n-lock transaction:

same as before

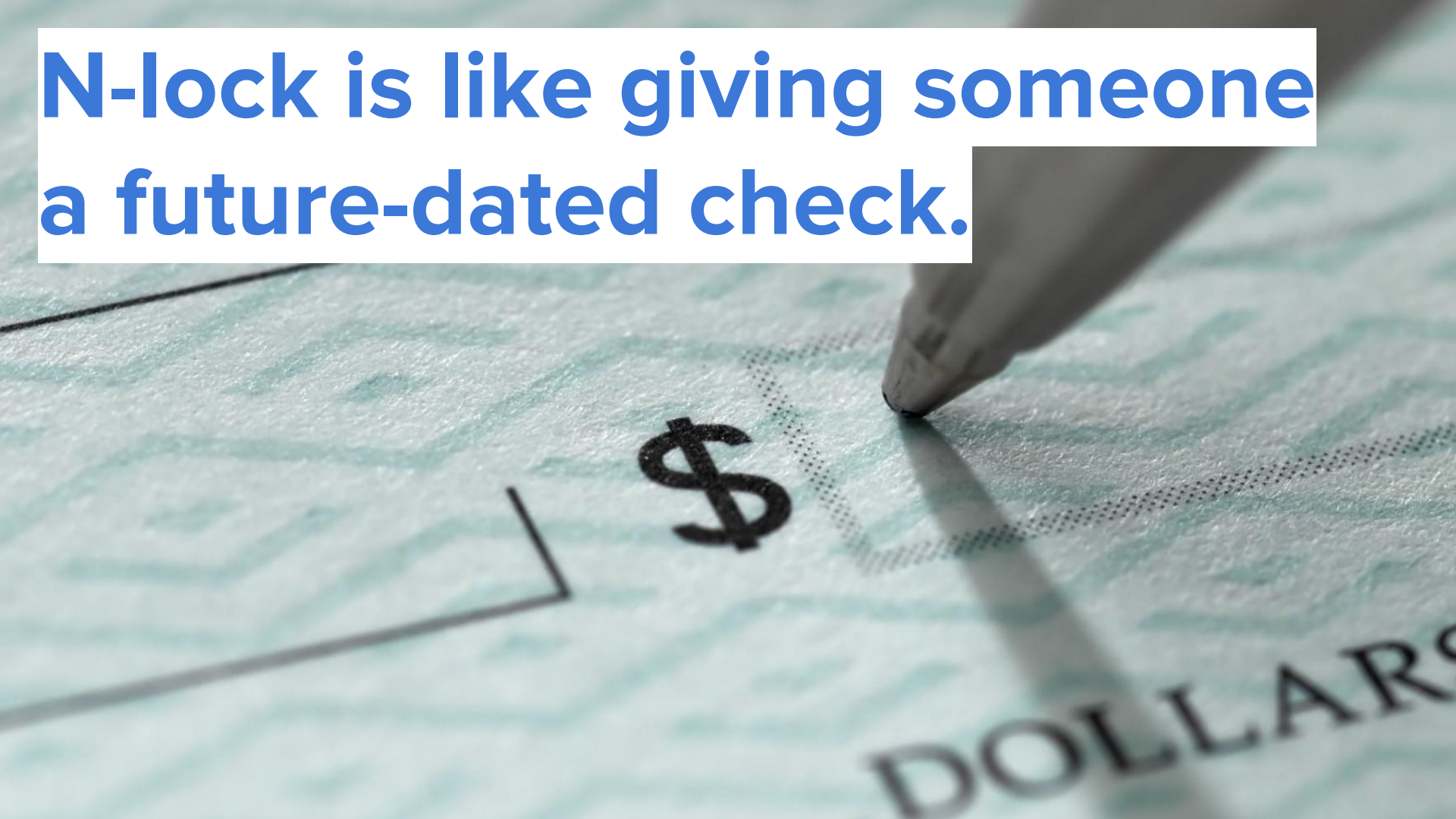
This is my proof that I have *key x* that matches *address y* which was previously sent *bitcoins z*.

} Answer to previous challenge.

Creation of new challenge.

{ Now make *bitcoins z* only spendable by person who can prove that they have key a that matches *address b* ***after this date in the future.***

**N-LOCK transactions create challenges where bitcoins can only be spent *after a certain amount of time*.**


N-lock is like giving someone
a future-dated check.
$
DOLLARS

# The world of possible wallets:

# Hosted

# Software

# Multi-sig

# Multi-sig with KRS

# Multi-sig with N-lock

# Hosted Wallet

Bitcoins locked with simple one key challenge statement, wallet provider generates key and stores it for user in data center, user can request transactions on website.

**Public Blockchain** **Hosted Wallet Inc.** **User**

# Software Wallet

Bitcoins locked with simple one key challenge statement, wallet provider writes software that user runs on her own computer, user generates key and stores it for herself.

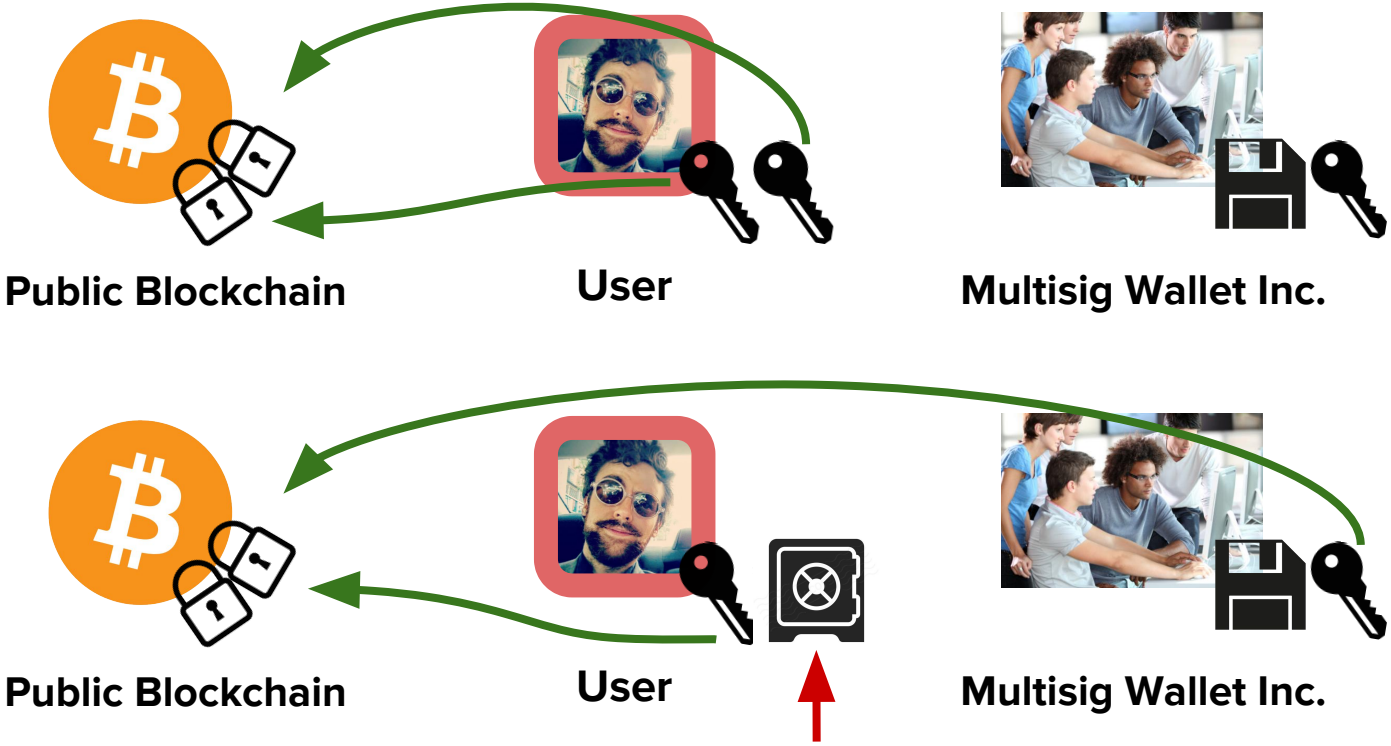
**Public Blockchain** **User** **Software Wallet Inc.**

# Multi-sig Wallet

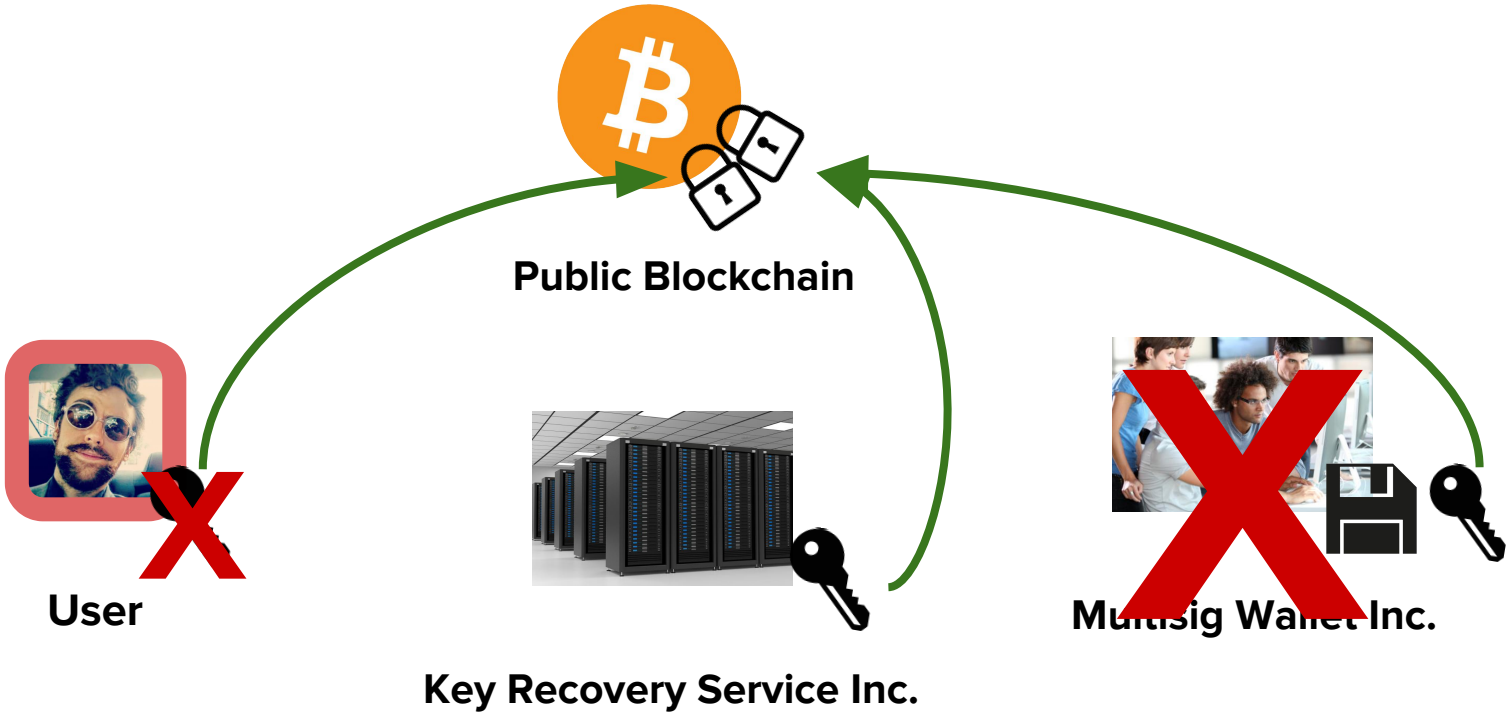
Bitcoins locked with 2 of 3 multisig challenge statement, wallet provider generates one key and stores it for user, user generates and stores other two keys.

**Public Blockchain** **User** **Multisig Wallet Inc.**

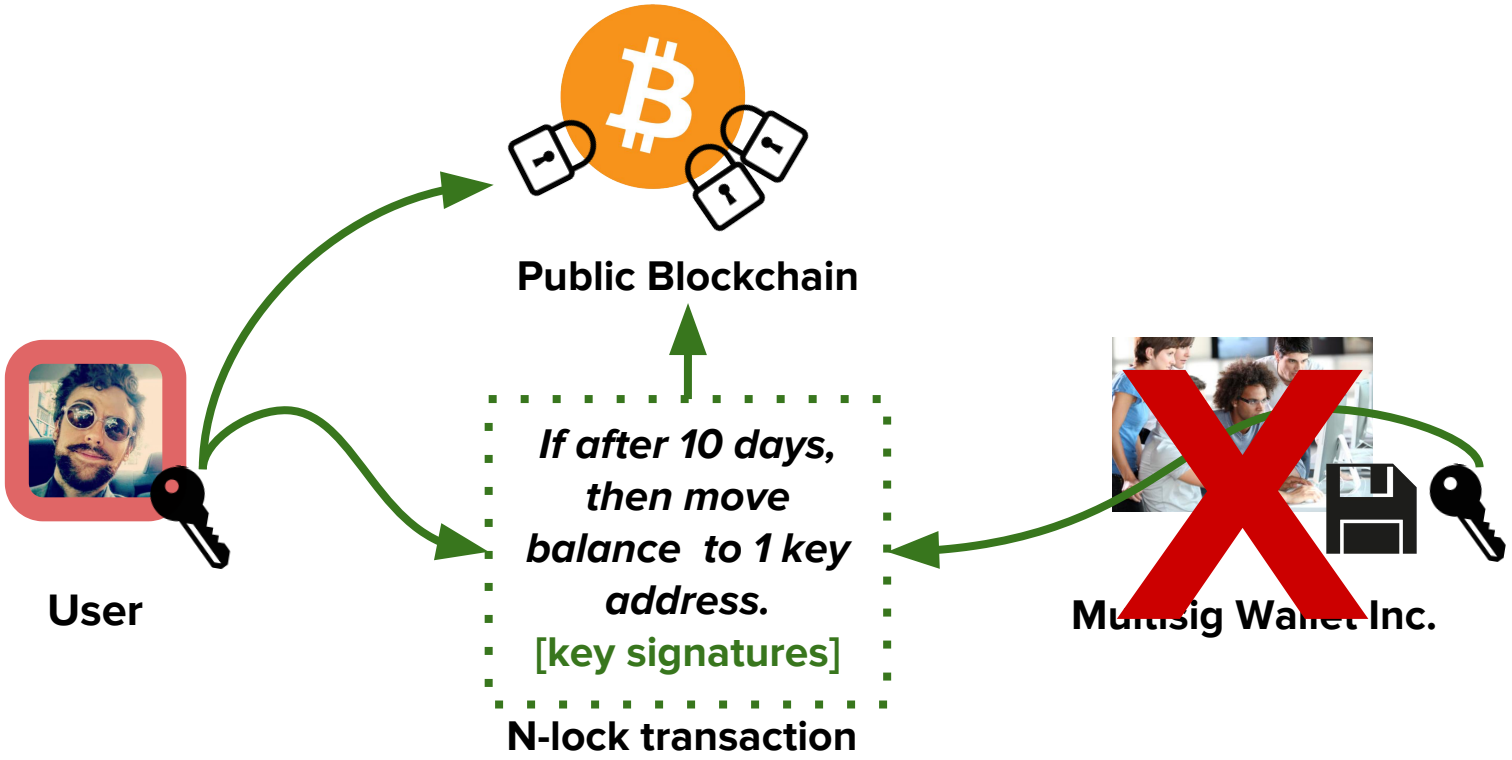
# Multi-sig Wallet Transactions



# Multi-sig Wallet with KRS



# Multi-sig Wallet with N-lock



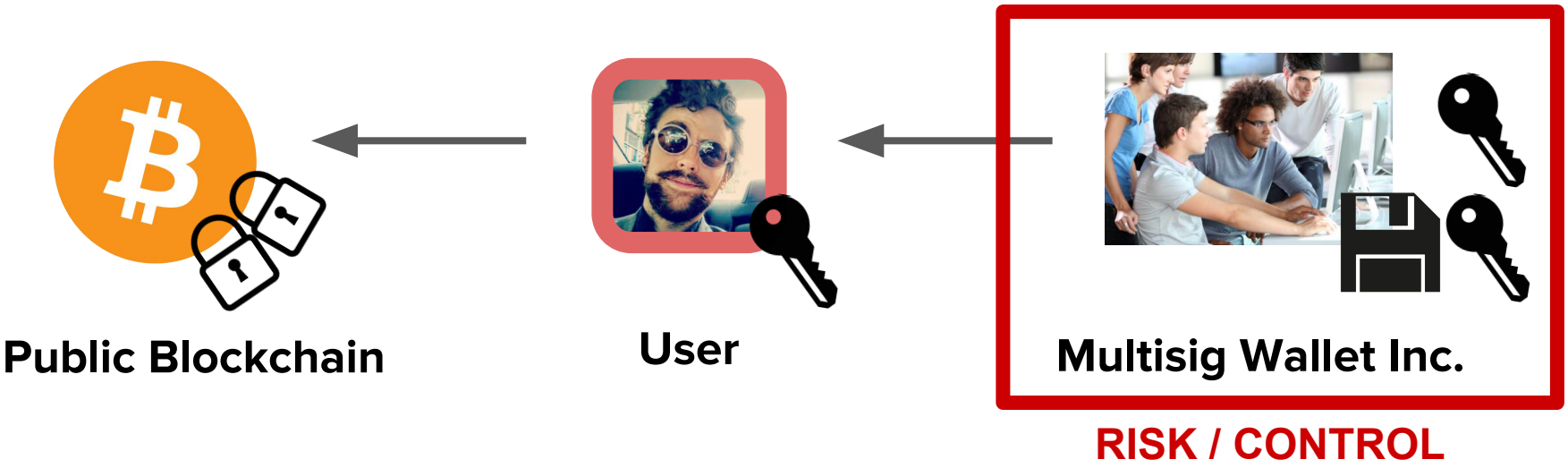
# So when is the user bearing the risk and when is the company?

# Hosted Wallet

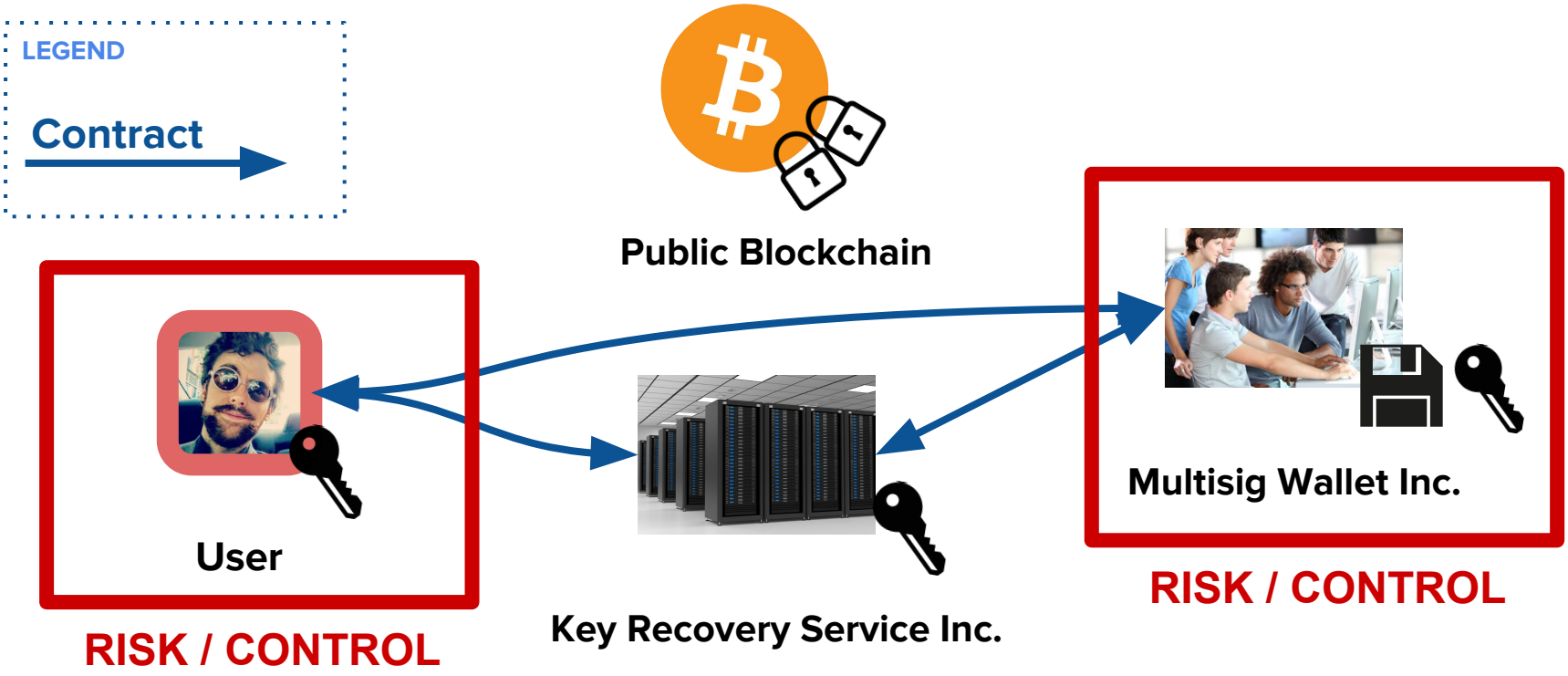

# Software Wallet

# Multi-sig Wallet (user 2 keys)

# Multi-sig Wallet (company has 2 keys)



# Multi-sig Wallet with KRS



# Multi-sig Wallet with N-lock

Public Blockchain

User

RISK / CONTROL
AFTER 10 DAYS

*If after 10 days, then move balance to 1 key address.*
[key signatures]

N-lock transaction

Multisig Wallet Inc.

# Who are the companies in these categories?

# Hosted Wallet Companies

coinbase xapo CIRCLE

**Hosted Wallet**
Bitcoins locked with simple one key challenge statement, wallet provider generates key and stores it for user.

# Software Wallet Companies




**Software Wallet**

Bitcoins locked with simple one key challenge statement, wallet provider writes software that user runs on her own computer, user generates key and stores it for herself.

# Multi-sig Companies




**Multi-sig Wallet**

Bitcoins locked with 2 of 3 or other multisig challenge statement, wallet provider retains at least one key and stores it for user, user stores other two keys or uses KRS.

# Multi-sig N-lock Companies


**Multi-sig N-lock Wallet**
Bitcoins locked with 2 of 2 multisig challenge statement, wallet provider generates and stores one key, user generates and stores second key. Additional N-Lock transaction signed by both will refund all bitcoin back to user in future.

# What happens if the company is hacked?

# What if hacked?

**Hosted Wallet: Company's keys may be stolen, if so user's bitcoin is also stolen.**

**Hosted Wallet**
Bitcoins locked with simple one key challenge statement, wallet provider generates key and stores it for user.

**Examples:**

coinbase xapo CIRCLE

# What if hacked?

**Software Wallet: Company does not have keys on their servers, hackers have nothing to steal.**

**Software Wallet**
Bitcoins locked with simple one key challenge statement, wallet provider writes software that user runs on her own computer, user generates key and stores it for herself.

**Examples:**

BLOCKCHAIN

bread wallet

mycelium ad-hoc economy

# What if hacked?

**Multi-sig Wallet: Company's key may be stolen, but one key of three is insufficient to steal the bitcoin. User can move bitcoin to new wallet with her two keys.**

**Multi-sig Wallet**
Bitcoins locked with 2 of 3 multisig challenge statement, wallet provider generates one key and stores it for user, user generates and stores other two keys.

**Examples:**

SECURED WITH BitGo™

Coinkite

Copay

# What if hacked?

**Multi-sig N-Lock Wallet: Company's key may be stolen, but insufficient to steal bitcoin. Hacker could block user from transacting, but user regains full control at end of n-lock.**

**Multi-sig N-lock Wallet**
Bitcoins locked with 2 of 2 multisig challenge statement, wallet provider generates and stores one key, user generates and stores second key. Additional N-Lock transaction signed by both will refund all bitcoin back to user in future.

**Examples:**

**What about multi-sig companies that have M of N (e.g. 2 of 3) keys? or have a partner company that along with them has sufficient keys to transact without the user?**

The company or companies are effectively a **hosted wallet**.

They can be hacked & bitcoin stolen.

The best way to

draw the line

between companies that do “hold” bitcoin and those that don’t is . . .

asking whether the company can unilaterally transact, or prevent transactions . . .

and if they can prevent, is there a reasonable time-limit (n-lock) that safely returns full control to the user?

# Additionally, we should wonder...

# Are wallets the only use case for multi-sig?

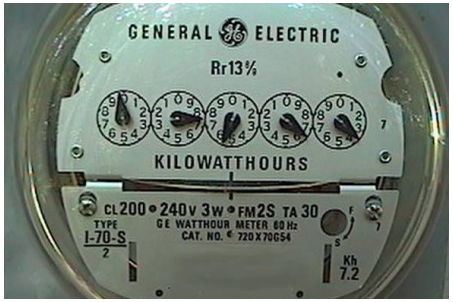
**ESCROW**

**INTERNAL CONTROLS**


**ARBITRATION**

# Not even close.

**METERING**




**MARGIN/HEDGING**

**SHARED ACCOUNTS**

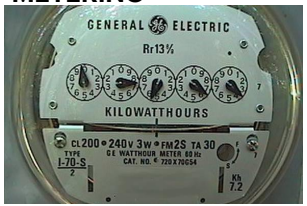
**Problem:** We don’t want to regulate any of these uses as money transmission. But it’s hard to draft an exemption that would cover all possible non-money transmission uses.

ESCROW

INTERNAL CONTROLS


ARBITRATION

METERING




MARGIN/HEDGING

SHARED ACCOUNTS

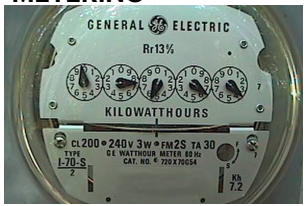
**Solution:** When properly set up, none of the providers of these tools will have the unilateral ability to execute, and those able to prevent will be reasonably time-limited.

ESCROW

INTERNAL CONTROLS


ARBITRATION

METERING




MARGIN/HEDGING

SHARED ACCOUNTS

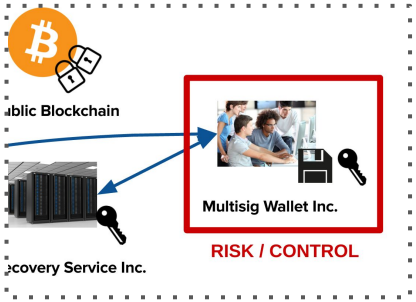
# Therefore, a definition like this:

***"Control of Virtual Currency"*** *means possession of sufficient credentials or authority on a network to* ***execute unilaterally**** *or* ***prevent indefinitely**** *virtual currency transactions.*

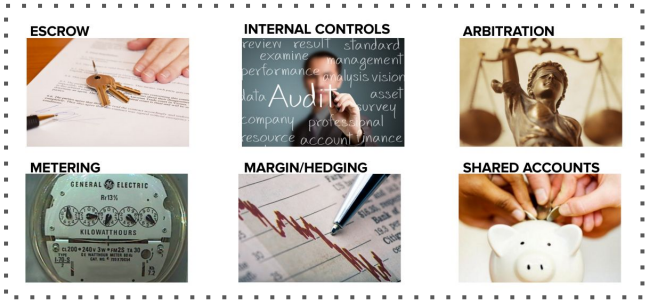
** thus excluding multi-sig minority key holders*

*** thus excluding key holders who offer n-lock refunds*

## Ensures that companies at risk and in control are included:




## And that innovative and low-risk companies are not:




Please visit coincenter.org to learn more.

# 18 USC 1960

The Most Important Criminal Statute You've Never Heard Of

# 18 U.S. Code § 1960 - Prohibition of unlicensed money transmitting businesses

(a) Whoever knowingly conducts, controls, manages, supervises, directs, or owns all or part of an **unlicensed money transmitting business**, shall be fined in accordance with this title or imprisoned not more than 5 years, or both.

. . .

# 18 U.S. Code § 1960

(b) As used in this section—

(1) the term “unlicensed money transmitting business” means a money transmitting business which affects interstate or foreign commerce in any manner or degree and—

(A) is operated without an appropriate money transmitting license in a State where such operation is punishable as a misdemeanor or a felony under State law, *whether or not the defendant knew that the operation was required to be licensed or that the operation was so punishable*;

(B) fails to comply with the money transmitting business registration requirements under section 5330 of title 31, United States Code, or regulations prescribed under such section; or

(C) otherwise involves the transportation or transmission of funds that are known to the defendant to have been derived from a criminal offense or are intended to be used to promote or support unlawful activity;