Monero 101

SCOTT ANECITO

Who am I?

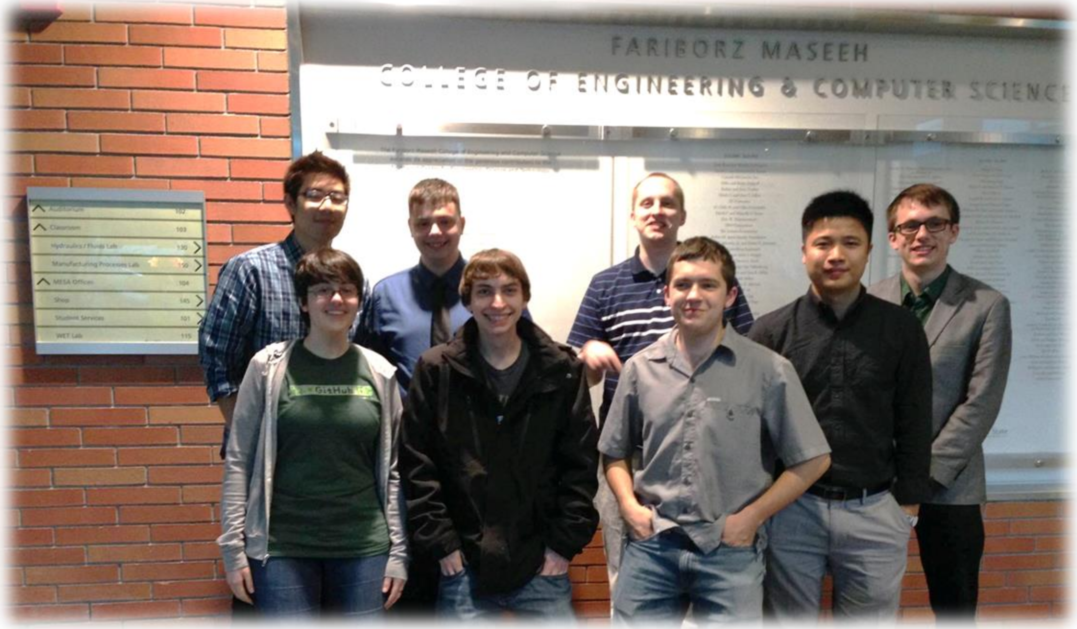
Privacy and security enthusiast

- Cookies of ‘00

Portland State University

- B.S Computer Science
- Associates in International Studies, Japanese
- Member of ACM, CTF/War Games club

Automation Engineer at Intel



/u/xmrscott

irc: xmrscott@freenode

https://github.com/sanecito/monero-presentations

How I came to Monero

Hides the following fingerprints:

- Sender wallet address
- Receiver wallet address
- Transaction amount
- IP Address*

Genesis and operations has no points for potential collusion

Ideally:

- Has no pre-mine
- Has no instamine
- Isn't primarily governed by a company (see: potential collusion)
- Has a relatively active and sizable community to grow project and quickly respond to exploits

Presentation Outline

Why does privacy matter?

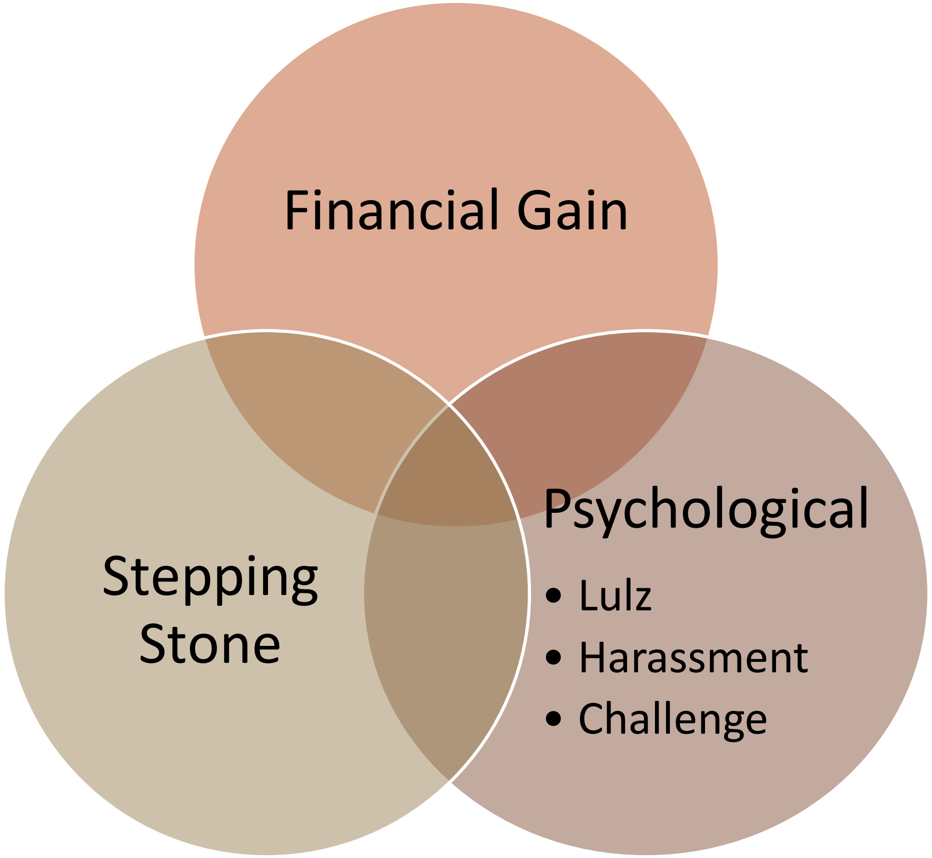
What is Monero?

Where did Monero come from?

How does Monero compare?

Where can I buy Monero and use it?

Why would people want your data?

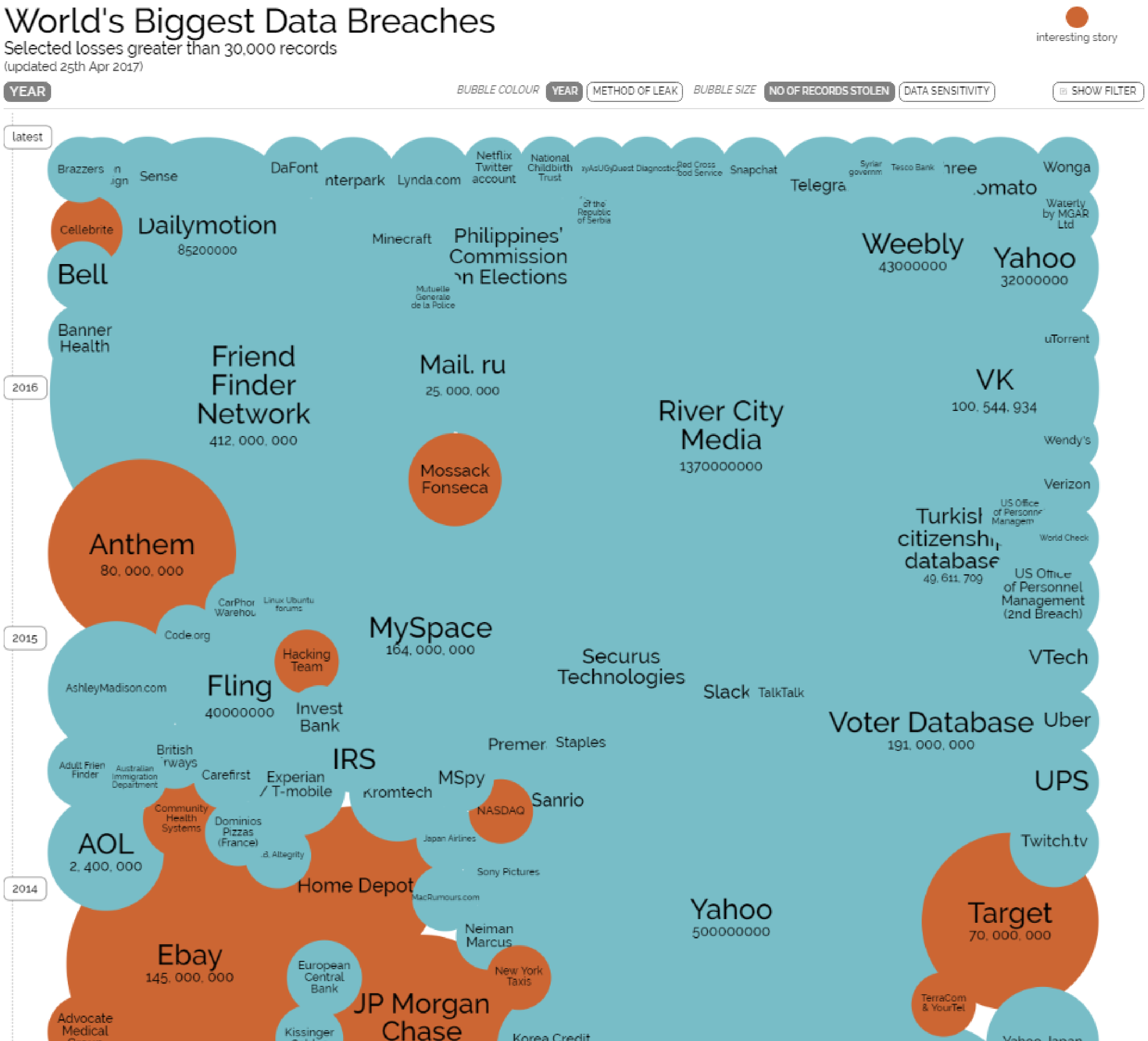


Financial Gain

Stepping Stone

Psychological

- Lulz
- Harassment
- Challenge



World's Biggest Data Breaches

Selected losses greater than 30,000 records

(updated 25th Apr 2017)

Source: informationisbeautiful.net

Office of Personnel Management

“The intruders… gained access to… employees’ Social Security numbers, job assignments, performance ratings and training information”

“attackers have targeted the forms submitted by intelligence and military personnel for security clearances. The document includes personal information – everything form eye colour to financial history, to past substance abuse, as well as contact details for the individual’s friends and relatives”

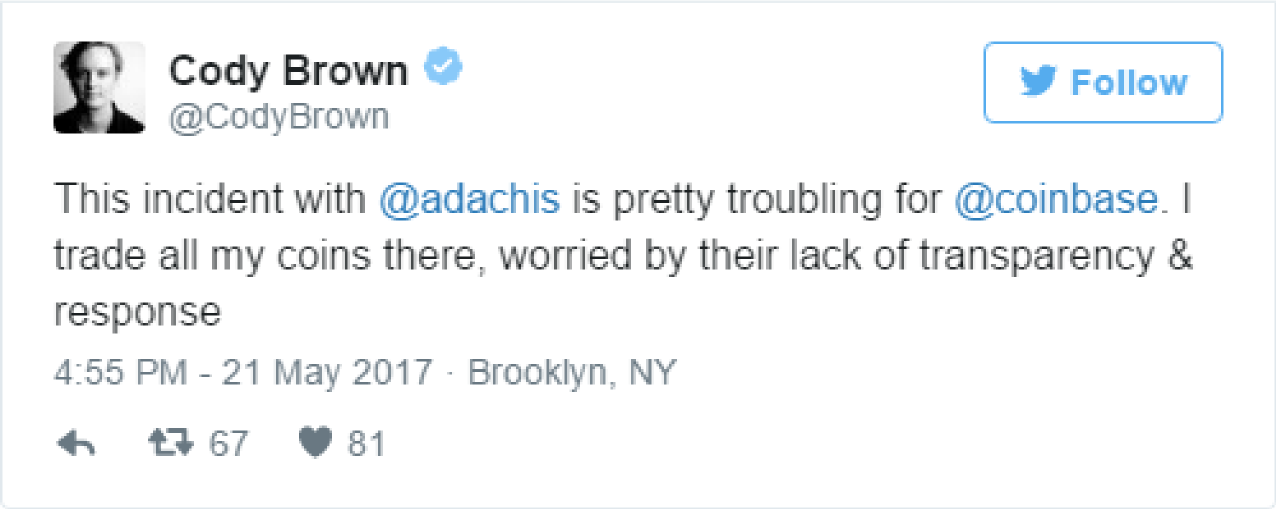
SOURCE: INFORMATIONISBEAUTIFUL.NET

“How to lose $8k worth of bitcoin in 15 minutes with Verizon and Coinbase.com”

AKA Smashing SMS-2FA for Fun and Profit

SOURCE: HTTPS://MEDIUM.COM/@CODYBROWN/HOW-TO-LOSE-8K-WORTH-OF-BITCOIN-IN-15-MINUTES-WITH-VERIZON-AND-COINBASE-COM-BA75FB8D0BAC
SEE ALSO: HTTPS://WWW.FORBES.COM/SITES/LAURASHIN/2016/12/20/HACKERS-HAVE-STOLEN-MILLIONS-OF-DOLLARS-IN-BITCOIN-USING-ONLY-PHONE-NUMBERS/AMP/

Step 1: Find a target via SNS



Cody Brown
@CodyBrown

This incident with @adachis is pretty troubling for @coinbase. I trade all my coins there, worried by their lack of transparency & response

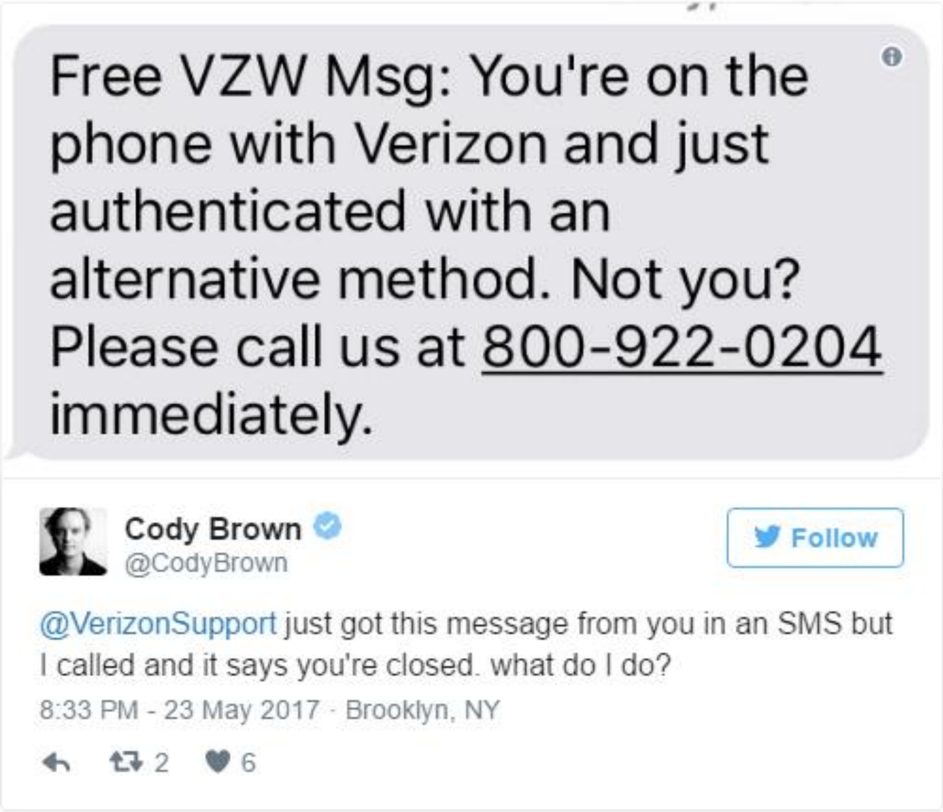
4:55 PM - 21 May 2017 · Brooklyn, NY

Step 2: Have info stolen/obtained

"After talking at length with [Verizon] customer service reps, I learned that the hacker did not need to give them my pin number or my social security number and was able to get approval to takeover my cell phone number with *simple billing information*."

FOR SOME DEGREE OF PROTECTION SEE: HTTP://WWW.COMPUTERWORLD.COM/ARTICLE/2849263/DATA-PRIVACY/DOXXING-DEFENSE-REMOVE-YOUR-PERSONAL-INFO-FROM-DATA-BROKERS.HTML

Step 3: Use info to take control of phone



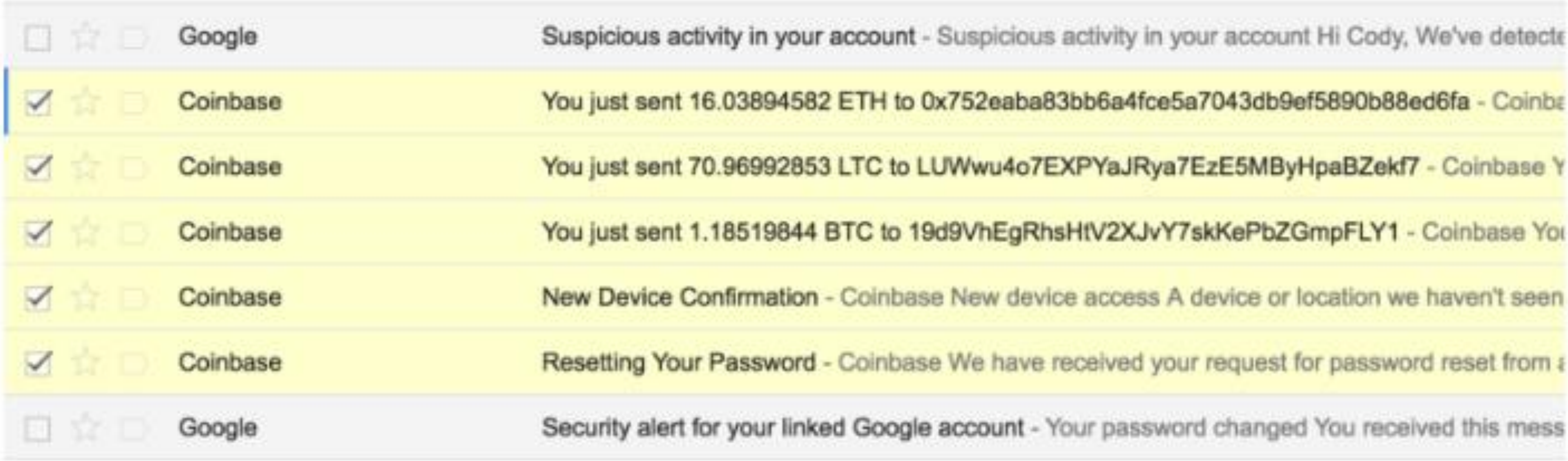
Free VZW Msg: You're on the phone with Verizon and just authenticated with an alternative method. Not you? Please call us at 800-922-0204 immediately.

Cody Brown
@CodyBrown

@VerizonSupport just got this message from you in an SMS but I called and it says you're closed. what do I do?

8:33 PM - 23 May 2017 · Brooklyn, NY

Step 4: Profit



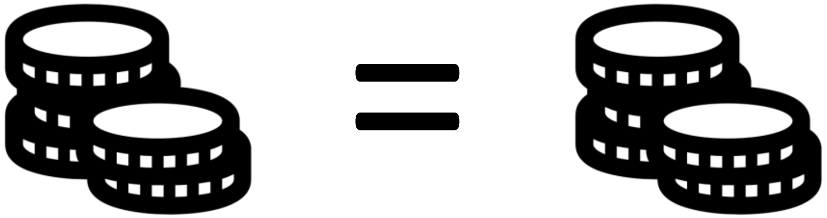
☐	☆	Google	**Suspicious activity in your account** - Suspicious activity in your account Hi Cody, We've detecte
☑	☆	Coinbase	**You just sent 16.03894582 ETH to 0x752eaba83bb6a4fce5a7043db9ef5890b88ed6fa** - Coinba
☑	☆	Coinbase	**You just sent 70.96992853 LTC to LUWwu4o7EXPYaJRya7EzE5MByHpaBZekf7** - Coinbase Y
☑	☆	Coinbase	**You just sent 1.18519844 BTC to 19d9VhEgRhsHtV2XJvY7skKePbZGmpFLY1** - Coinbase Yo
☑	☆	Coinbase	**New Device Confirmation** - Coinbase New device access A device or location we haven't seen
☑	☆	Coinbase	**Resetting Your Password** - Coinbase We have received your request for password reset from a
☐	☆	Google	**Security alert for your linked Google account** - Your password changed You received this mess

The hacker deleted these emails but google recovered them

Why does *financial privacy* matter?

People know your income, wealth accumulation

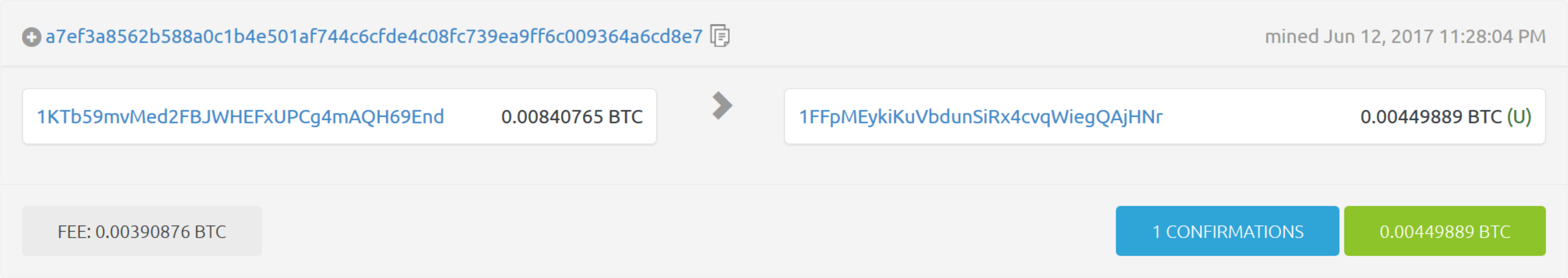
Targeting and/or advertisements based on transactions



Interaction with unknown person of interest

People know your vendors and partners

What makes up a Bitcoin transaction?



a7ef3a8562b588a0c1b4e501af744c6cfde4c08fc739ea9ff6c009364a6cd8e7

mined Jun 12, 2017 11:28:04 PM

1KTb59mvMed2FBJWHEFxUPCg4mAQH69End 0.00840765 BTC

1FFpMEykiKuVbdunSiRx4cvqWiegQAjHNr 0.00449889 BTC (U)

FEE: 0.00390876 BTC

1 CONFIRMATIONS

0.00449889 BTC

SOURCE: BLOCKEXPLORER.COM

Bitcoin De-anonymization

Coinbase sent Troia back an email explaining that those actions were against the exchange's rules and shut down his account. Troia then tried setting up an account with [his family’s info]. Shut down.

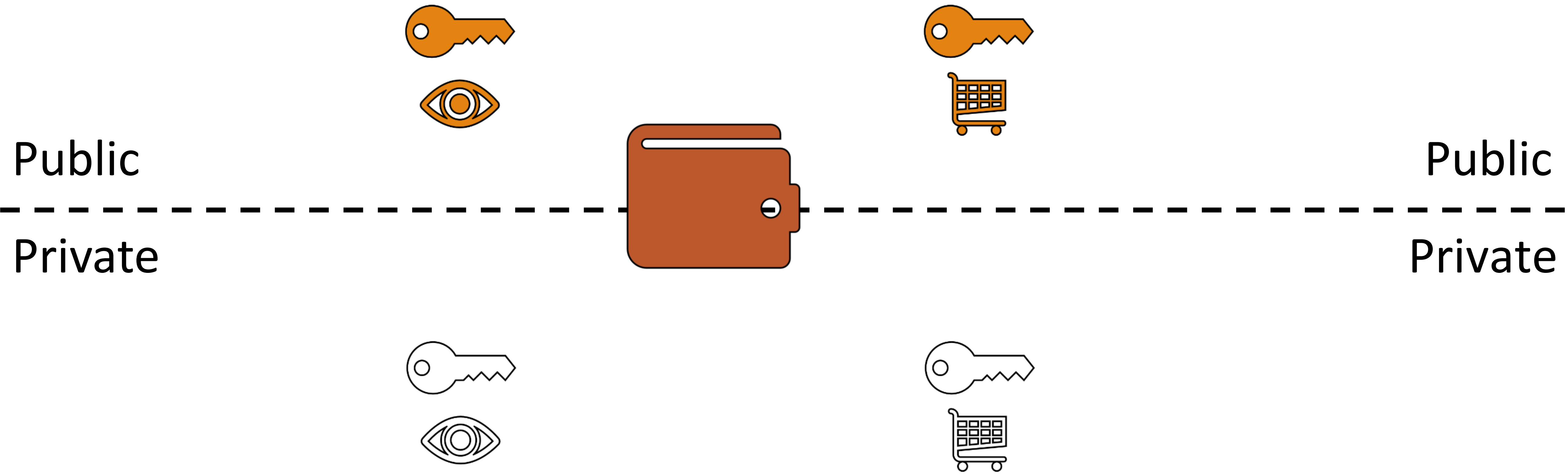
The FBI is requesting $21m and 80 new employees in a bid to investigate emerging tech that could help the agency combat cybercrime. […] This notably includes cases that involve "drug traffickers using virtual currencies to obscure their transactions".

SOURCES: HTTP://WWW.COINDESK.COM/COINBASE-WHITE-HAT-HACKER-DONT-WANT-BITCOIN/
HTTP://WWW.COINDESK.COM/ILLICIT-CRYPTOCURRENCY-USE-TARGETED-PROPOSED-2018-FBI-BUDGET/

Monero Protocol Protection

Sender (Alice)	Amount	Network	Receiver (Bob)
Ring Signatures	RingCT	Kovri	Stealth Addresses

Monero Wallet



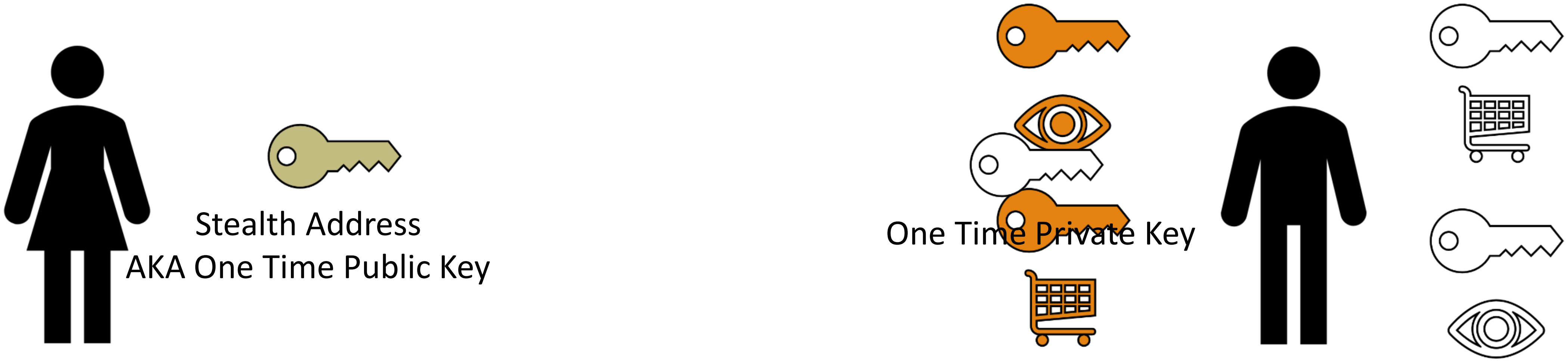
Public

Private

Public

Private

Stealth Addresses

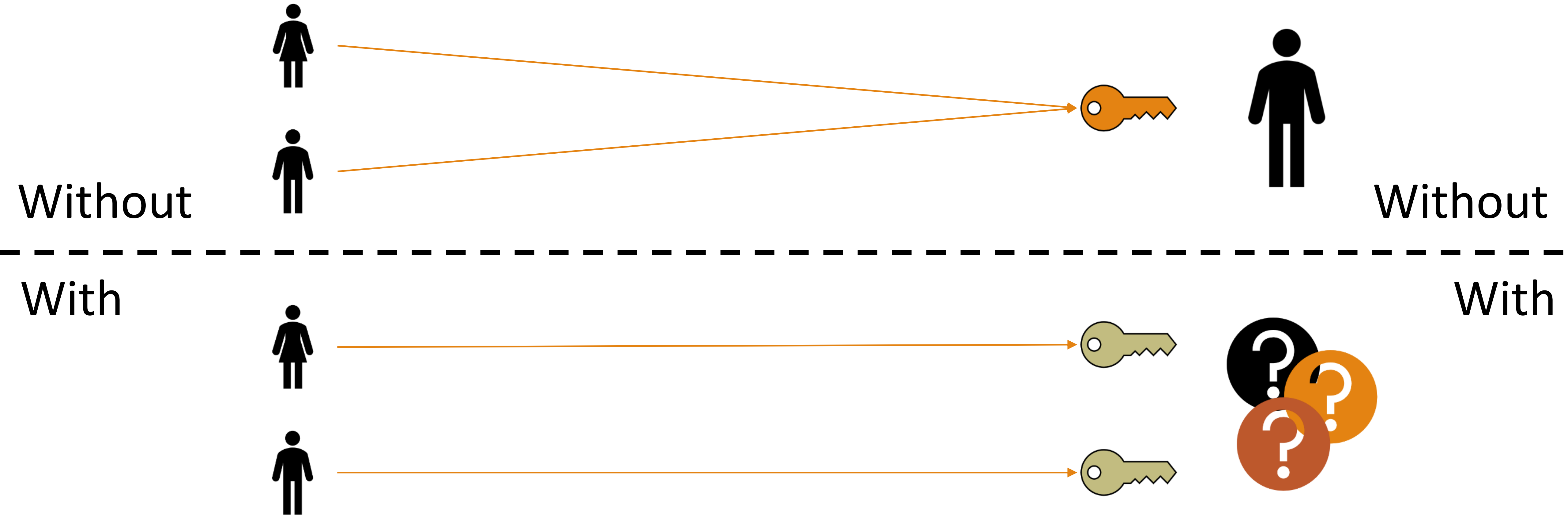


Stealth Address
AKA One Time Public Key

One Time Private Key

FOR IN-DEPTH + DEMO: HTTPS://STEEMIT.COM/MONERO/@LUIGI1111/UNDERSTANDING-MONERO-CRYPTOGRAPHY-PRIVACY-PART-2-STEALTH-ADDRESSES

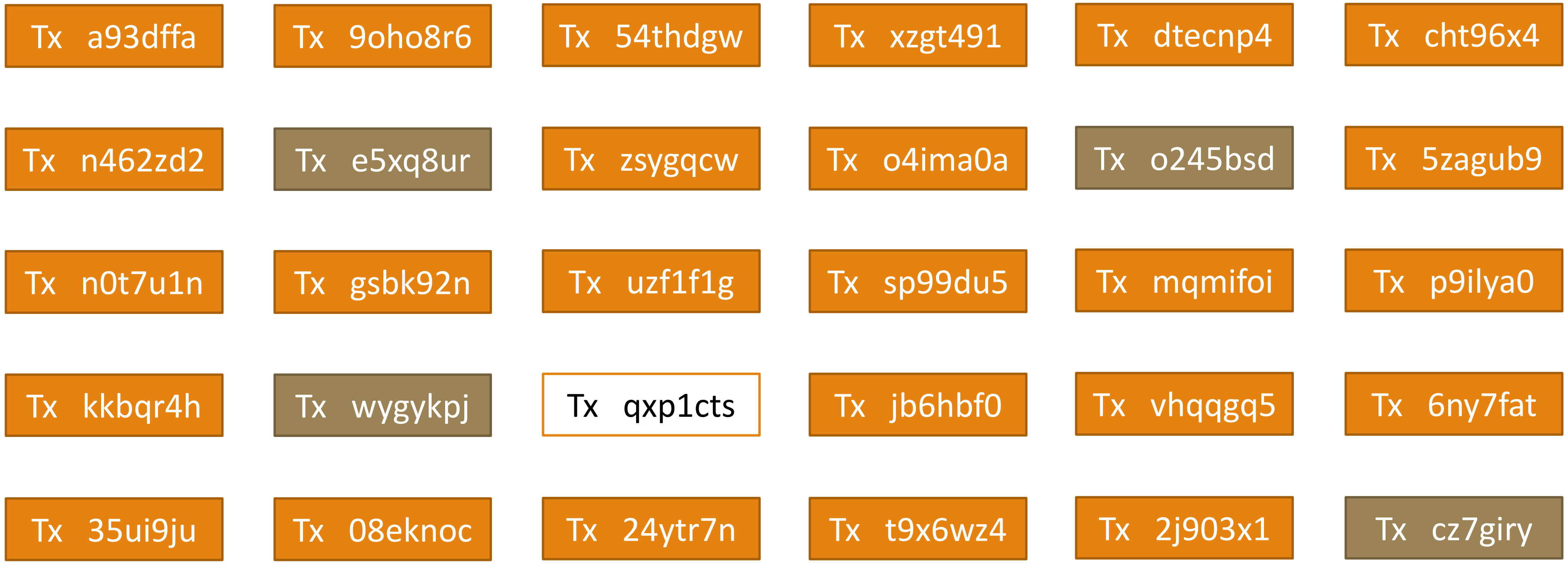
Stealth Addresses (cont'd)



Ring Signatures

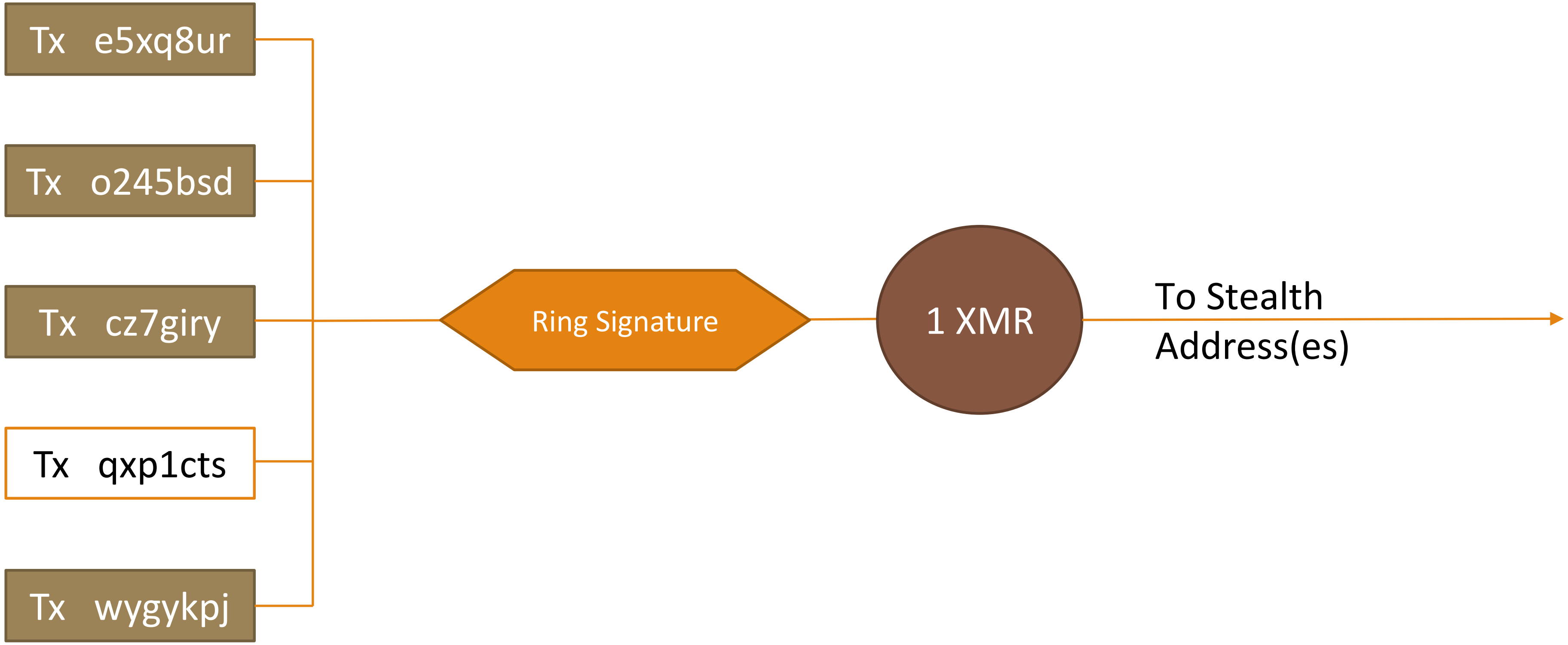
Tx a93dffa	Tx 9oho8r6	Tx 54thdgw	Tx xzgt491	Tx dtecnp4	Tx cht96x4
Tx n462zd2	Tx e5xq8ur	Tx zsygqcw	Tx o4ima0a	Tx o245bsd	Tx 5zagub9
Tx n0t7u1n	Tx gsbk92n	Tx uzf1f1g	Tx sp99du5	Tx mqmifoi	Tx p9ilya0
Tx kkbqr4h	Tx wygykpj	Tx qxp1cts	Tx jb6hbf0	Tx vhqqgq5	Tx 6ny7fat
Tx 35ui9ju	Tx 08eknoc	Tx 24ytr7n	Tx t9x6wz4	Tx 2j903x1	Tx cz7giry

Ring Signatures

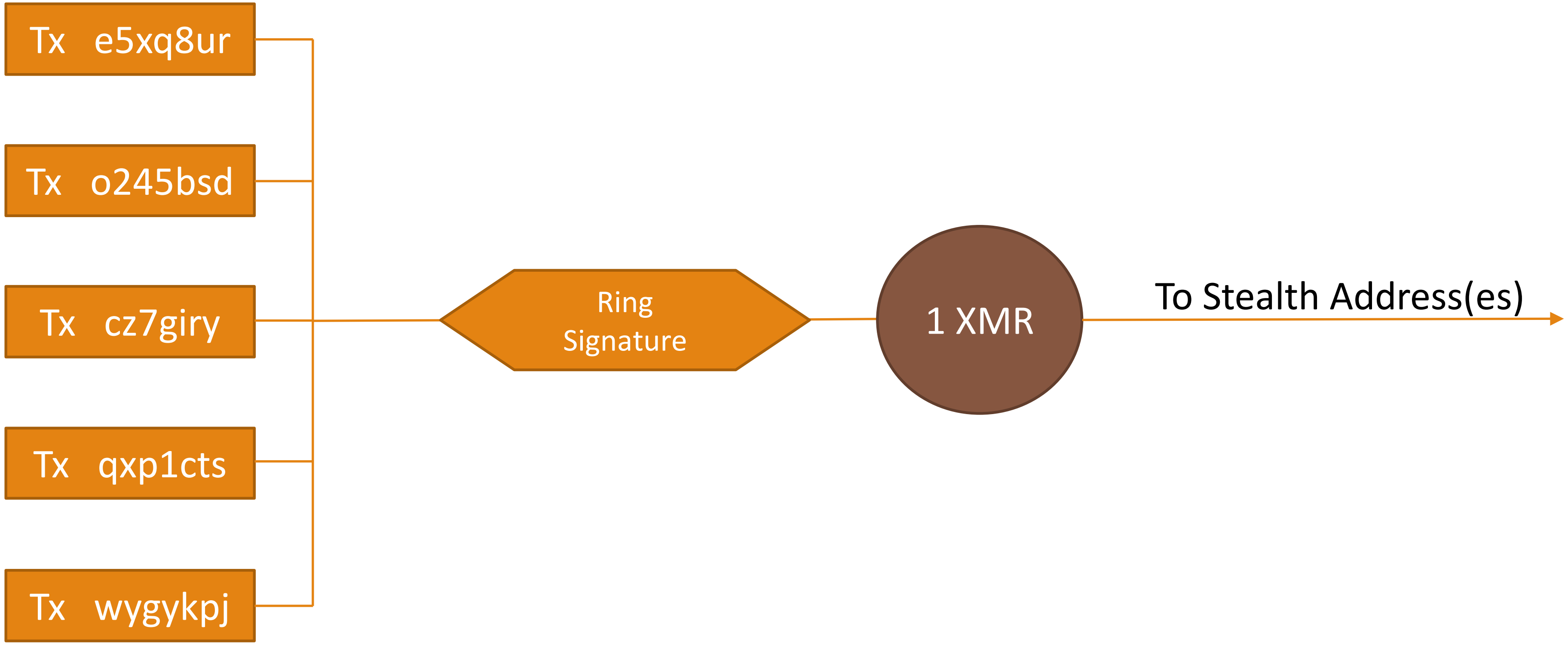


Tx a93dffa	Tx 9oho8r6	Tx 54thdgw	Tx xzgt491	Tx dtecnp4	Tx cht96x4
Tx n462zd2	Tx e5xq8ur	Tx zsygqcw	Tx o4ima0a	Tx o245bsd	Tx 5zagub9
Tx n0t7u1n	Tx gsbk92n	Tx uzf1f1g	Tx sp99du5	Tx mqmifoi	Tx p9ilya0
Tx kkbqr4h	Tx wygykpj	Tx qxp1cts	Tx jb6hbf0	Tx vhqqgq5	Tx 6ny7fat
Tx 35ui9ju	Tx 08eknoc	Tx 24ytr7n	Tx t9x6wz4	Tx 2j903x1	Tx cz7giry

Ring Signatures



Ring Signatures



Taken from Justin Ehrenhofer’s presentations

Ring Signatures & RingCT

INPUTS

5

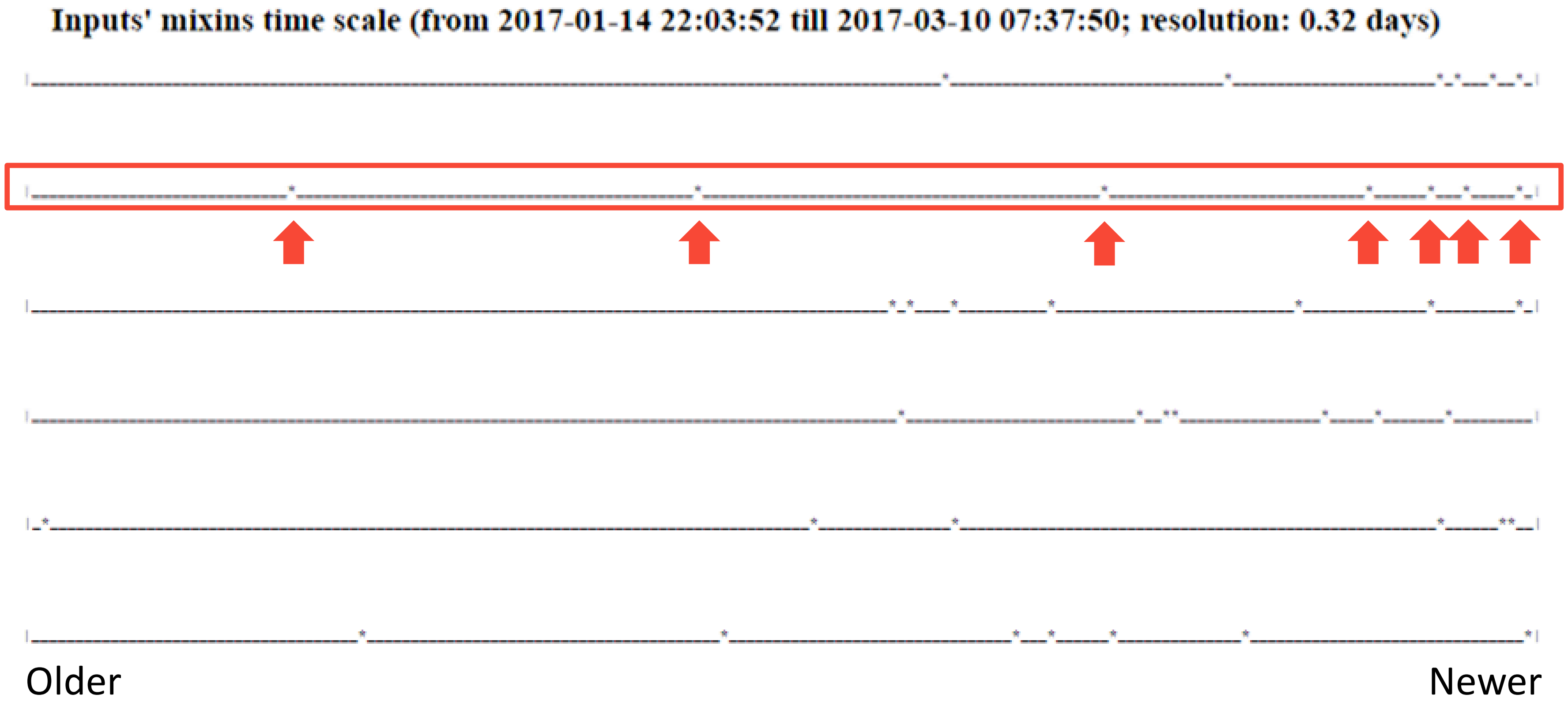
8

11

15

18

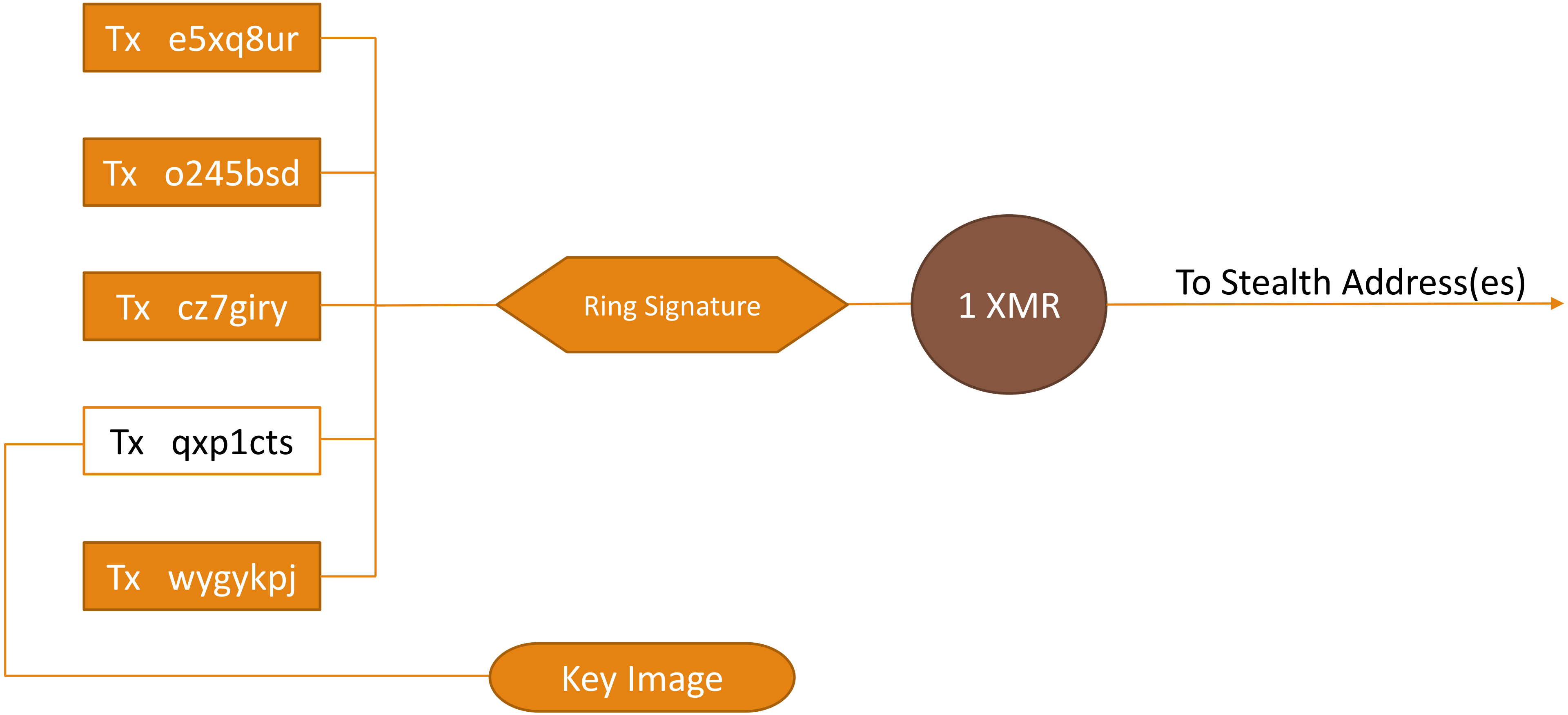
21



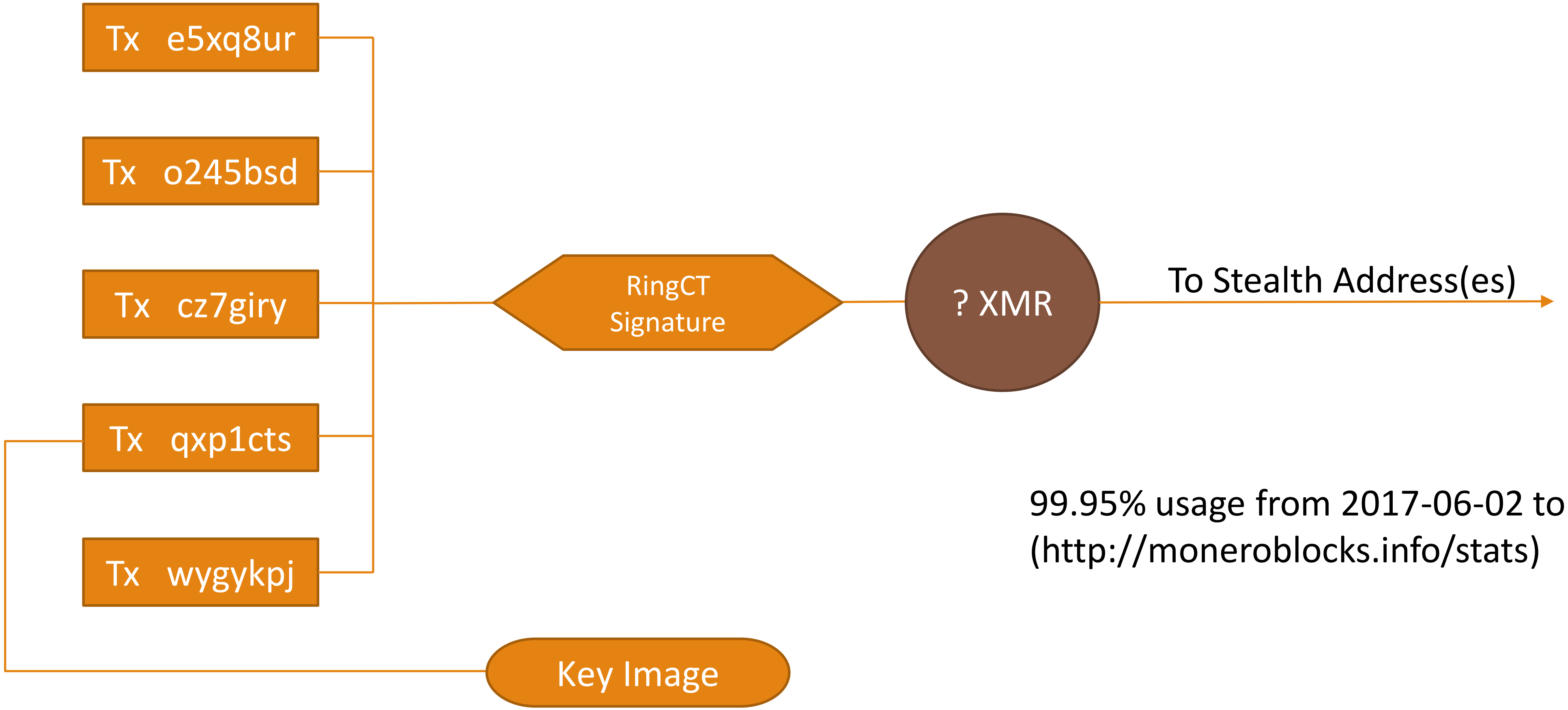
Inputs' mixins time scale (from 2017-01-14 22:03:52 till 2017-03-10 07:37:50; resolution: 0.32 days)

HTTPS://XMRCHAIN.NET/SEARCH?VALUE=9BB608C70622CE67333C267103241F19B8ACA21B7915F237813E451E1F03576E

Ring Signatures



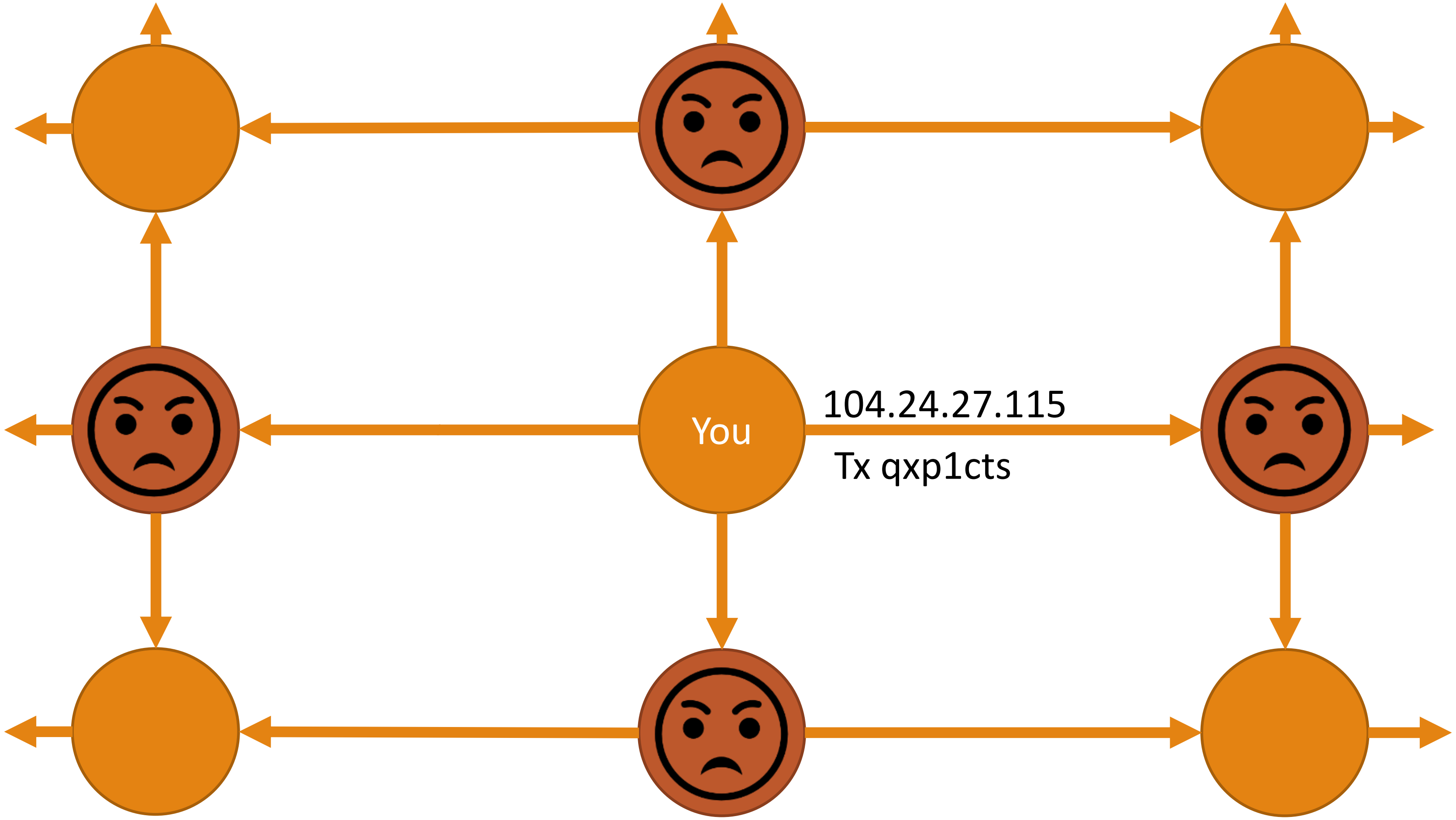
Ring Confidential Transactions (RingCT)



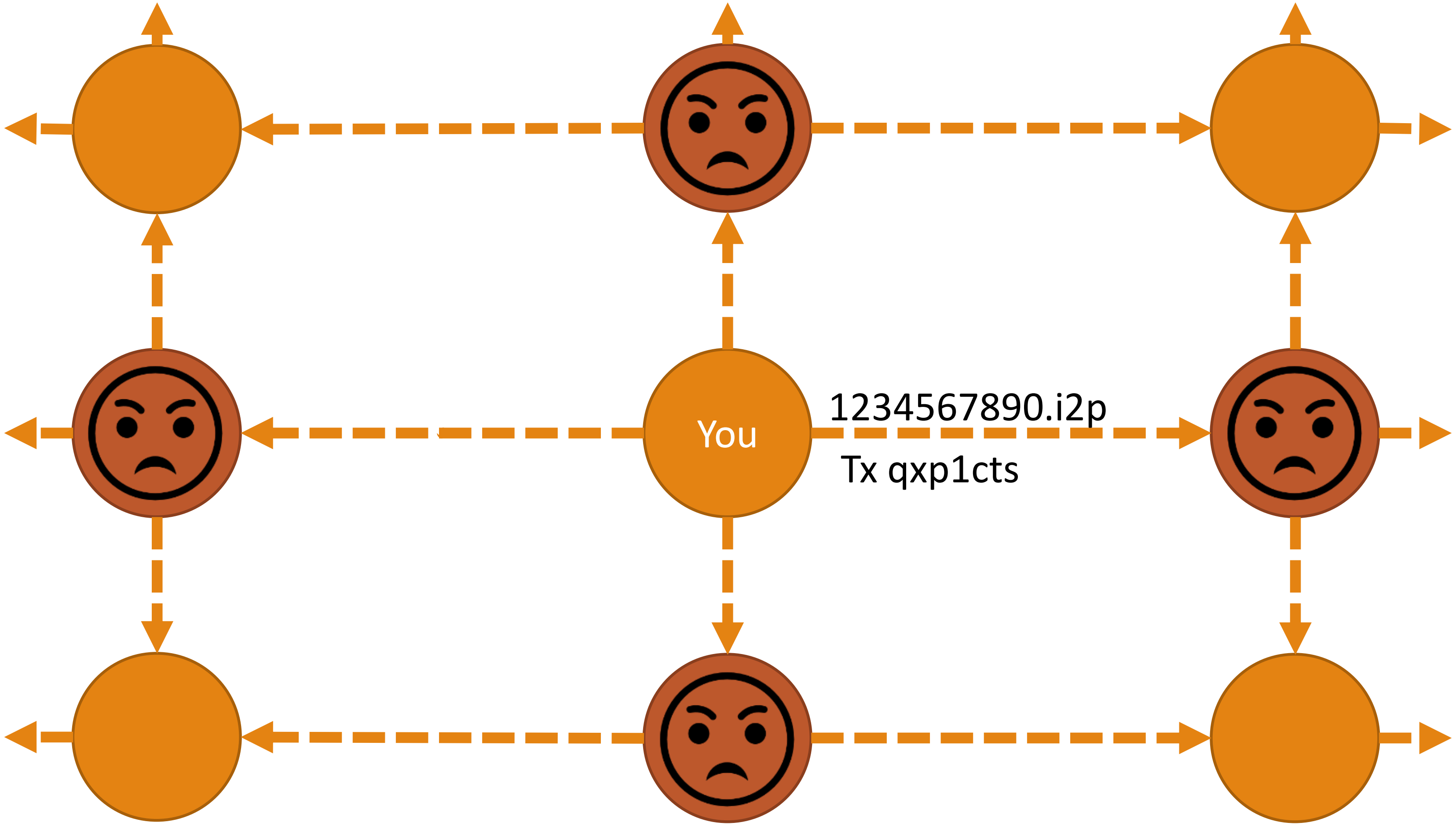
99.95% usage from 2017-06-02 to 2017-06-25
(http://moneroblocks.info/stats)

SEE: HTTPS://LAB.GETMONERO.ORG/PUBS/MRL-0005.PDF

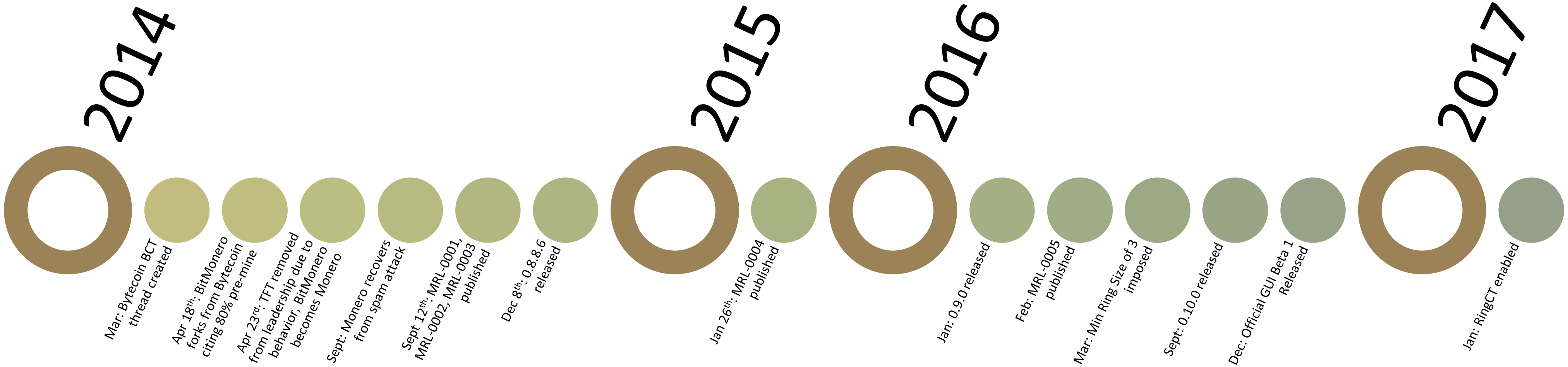
Kovri (without)



Kovri



A Brief History of Monero



2014

Mar: Bytecoin BCT thread created

Apr 18th: BitMonero forks from Bytecoin citing 80% pre-mine

Apr 23rd: TFT removed from leadership due to behavior, BitMonero becomes Monero

Sept: Monero recovers from spam attack

Sept 12th: MRL-0001, MRL-0002, MRL-0003 published

Dec 8th: 0.8.8.6 released

2015

Jan 26th: MRL-0004 published

2016

Jan: 0.9.0 released

Feb: MRL-0005 published

Mar: Min Ring Size of 3 imposed

Sept: 0.10.0 released

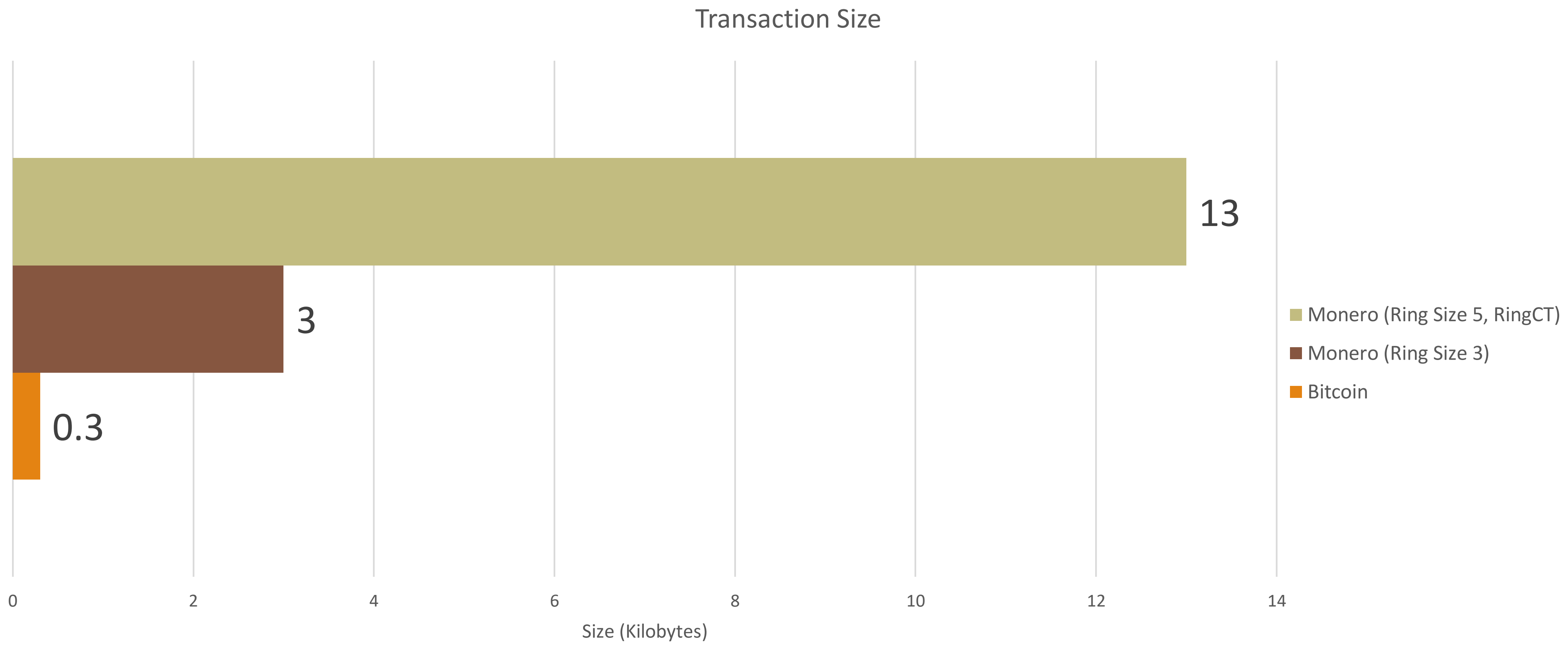
Dec: Official GUI Beta 1 Released

2017

Jan: RingCT enabled

	~~Xcoin~~ ~~Darkcoin~~ Dash	Monero	Zcash
Hides Sender?	PrivateSend*	Yes	Z-addr Tx*
Hides Receiver?	PrivateSend*	Yes	Z-addr Tx*
Hides Transaction $?	PrivateSend*	Yes	Z-addr Tx*
Hides IP?*	No	No	No
% of Tx that are 'Private'?	Unknown	100% Ring, ~100% RingCT	25%*
Trustless?	No	Yes	No
Primary Governance?	US Company / Masternodes	FLOSS	US Company
Pre-mine or Insta-mine?	Insta-mine	No	No*
Block Reward Fee	45% to Masternodes 10% to Treasury	No	20% for 4 years, "Founders' Reward"
Block Time	2.5 minutes	2 minutes	2.5 minutes
CoinCap	~~84~~ 18.9 million	18.4 mil + .3/min emission	21 million

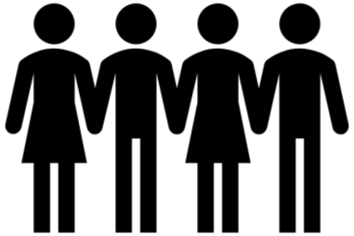
Scalability



Probability

Ring Size 5 != 20 / 20 / 20 / 20 / 20 Probability

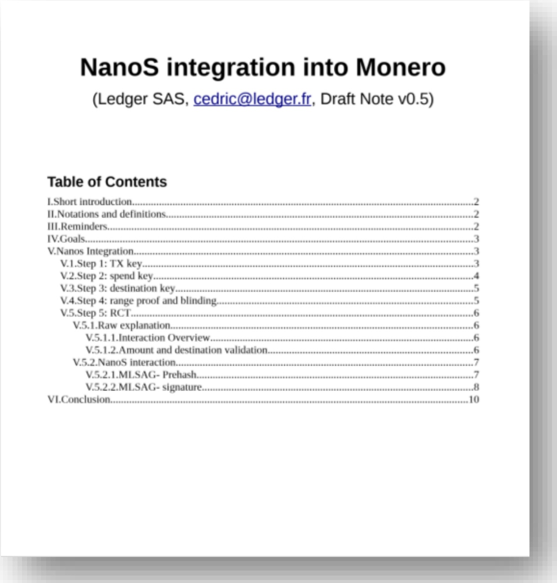
Roadmap



Multisig

Tails

theamnesicincognitolivesystem



NanoS integration into Monero

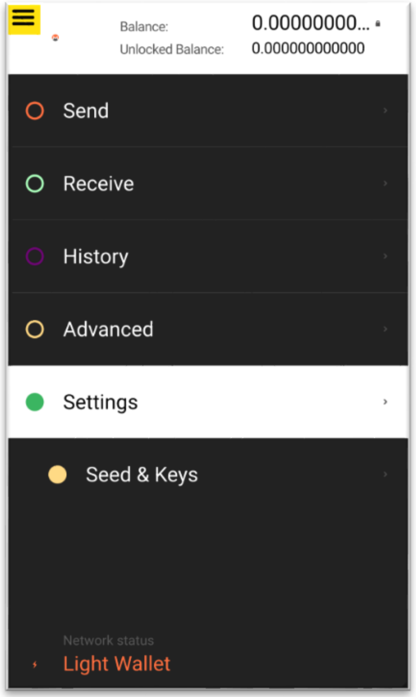
(Ledger SAS, cedric@ledger.fr, Draft Note v0.5)

Table of Contents

I.Short introduction.....2
II.Notations and definitions.....2
III.Reminders.....2
IV.Goals.....3
V.Nanos Integration.....3
V.1.Step 1: TX key.....3
V.2.Step 2: spend key.....4
V.3.Step 3: destination key.....5
V.4.Step 4: range proof and blinding.....5
V.5.Step 5: RCT.....6
V.5.1.Raw explanation.....6
V.5.1.1.Interaction Overview.....6
V.5.1.2.Amount and destination validation.....6
V.5.2.NanoS interaction.....7
V.5.2.1.MLSAG- Prehash.....7
V.5.2.2.MLSAG- signature.....8
VI.Conclusion.....10

September 2017 Hardfork

- RingCT enforced
- Increased min Ring Size



Balance: 0.00000000...

Unlocked Balance: 0.000000000000

Network status

Light Wallet

fluffyblocks

Rates Compared (*Circa Sept 2016 for $100)

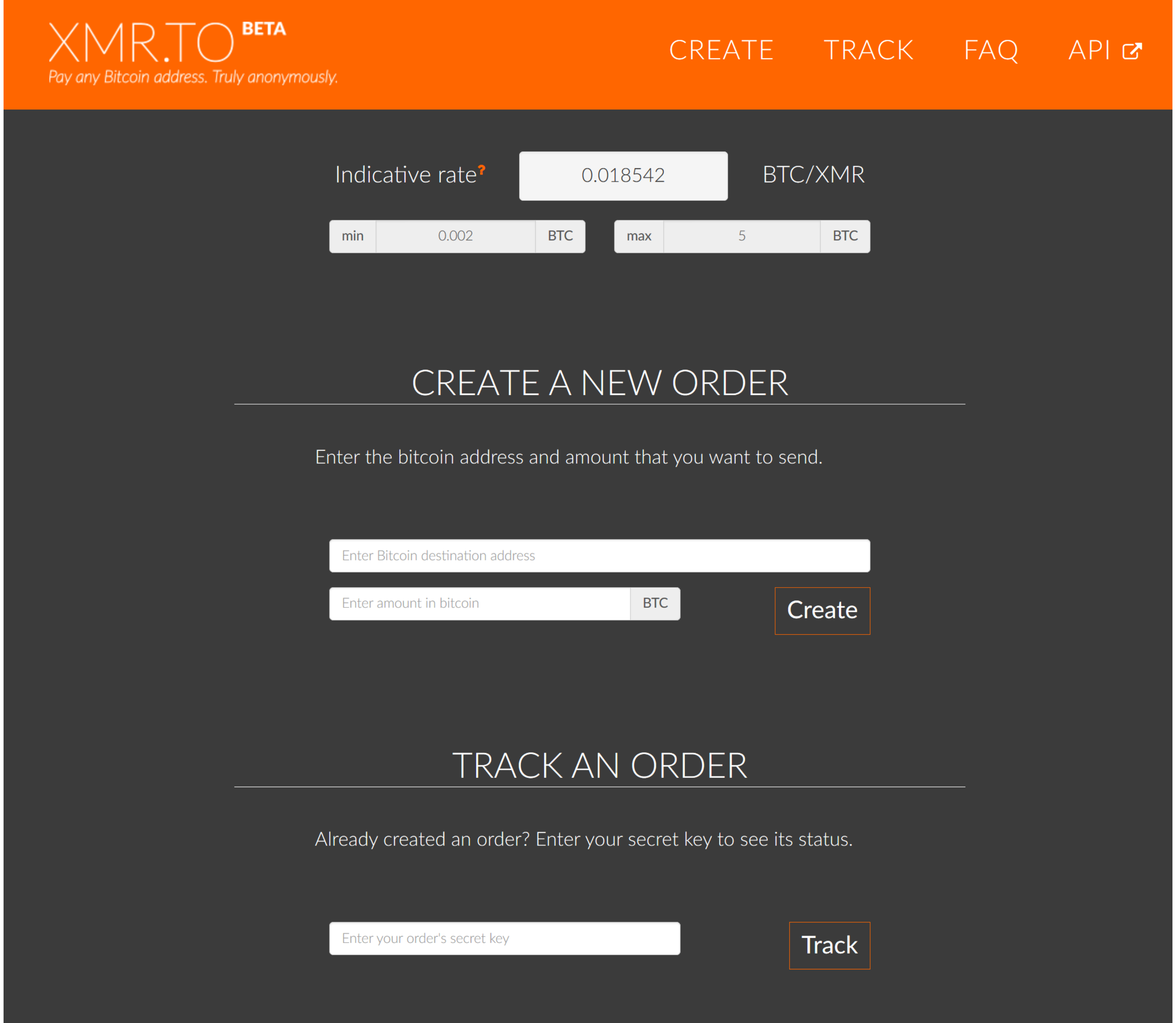
Poloniex: 0.25% (GDAX) + 0.25% (Poloniex) + .2 XMR = **~2.5% fees***

Shapeshift: GDAX + Shapeshift Exchange Rate = **~7% fees***

Kraken: $10 (Wire Transfer) + $? (Bank's Wire Transfer Fee) + 0.26%

Bisq (Formerly Bitsquare): Depends on seller (Fiat/BTC) + chosen exchange rate (BTC/XMR)

TAKEN FROM: HTTPS://MONEROERIC.COM/BUY-MONERO-BITCOIN-SHAPESHIFT-POLONIEX/


XMR.TO BETA
Pay any Bitcoin address. Truly anonymously.
CREATE
TRACK
FAQ
API

Indicative rate? 0.018542 BTC/XMR

min 0.002 BTC

max 5 BTC

CREATE A NEW ORDER

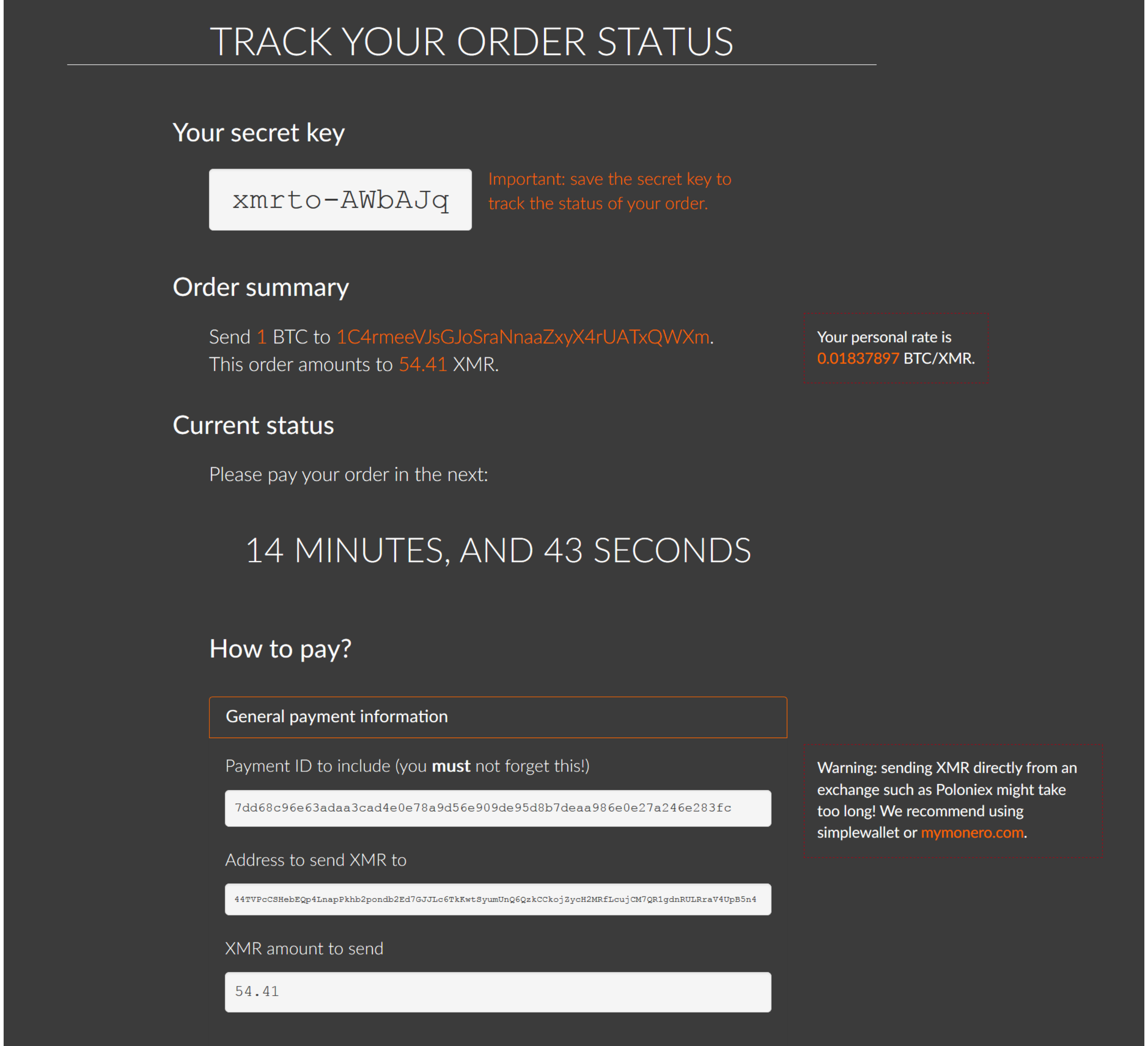
Enter the bitcoin address and amount that you want to send.

Enter Bitcoin destination address
Enter amount in bitcoin
BTC
Create

TRACK AN ORDER

Already created an order? Enter your secret key to see its status.

Enter your order's secret key
Track



TRACK YOUR ORDER STATUS

Your secret key

xmrto-AWbAJq

Important: save the secret key to track the status of your order.

Order summary

Send 1 BTC to 1C4rmeeVJsGJoSraNnaaZxyX4rUATxQWXm.
This order amounts to 54.41 XMR.

Your personal rate is 0.01837897 BTC/XMR.

Current status

Please pay your order in the next:

14 MINUTES, AND 43 SECONDS

How to pay?

General payment information

Payment ID to include (you **must** not forget this!)

7dd68c96e63adaa3cad4e0e78a9d56e909de95d8b7deaa986e0e27a246e283fc

Address to send XMR to

44TVPcCSHebEQp4LnapPkhb2pondb2Ed7GJJLc6TkKwtSyumUnQ6QzkCCkojZycH2MRfLcujCM7QR1gdnRULRraV4UpB5n4

XMR amount to send

54.41

Warning: sending XMR directly from an exchange such as Poloniex might take too long! We recommend using simplewallet or mymonero.com.

GetMonero.org

/r/Monero
/r/MoneroMining
/r/XMRTrader
/r/MoneroCommunity

Monero.stackexchange.com

irc: #monero
(freenode)