MONERO
Zagreb, Croatia

Welcome

Justin Ehrenhofer

Finance
Management Information Systems

/u/SamsungGalaxyPlayer

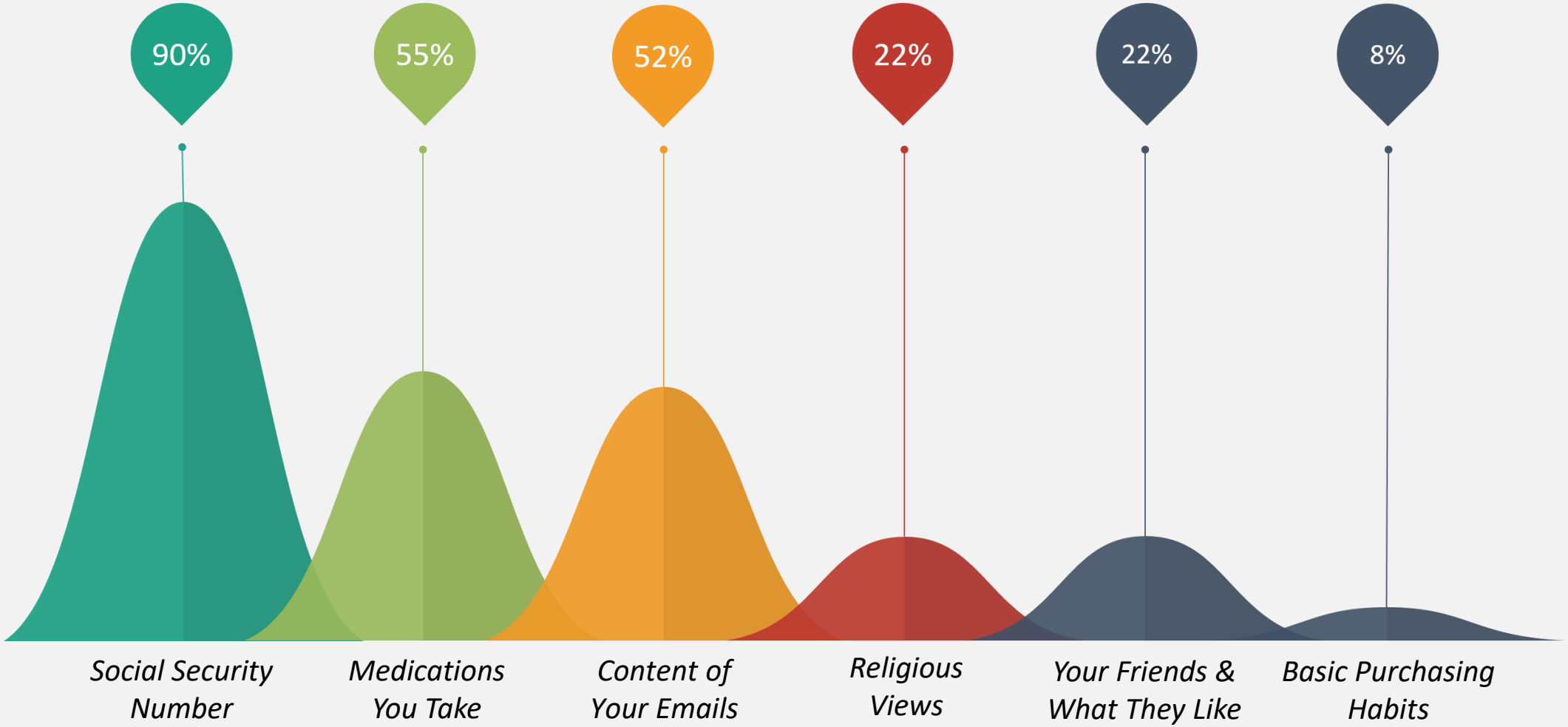
WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

UNIVERSITY OF MINNESOTA
Driven to Discover℠

CryptoUMN.com

People Don’t Care About Financial Privacy

Percentage of adults, in a November, 2014, USA survey, who view the following information as “very sensitive”

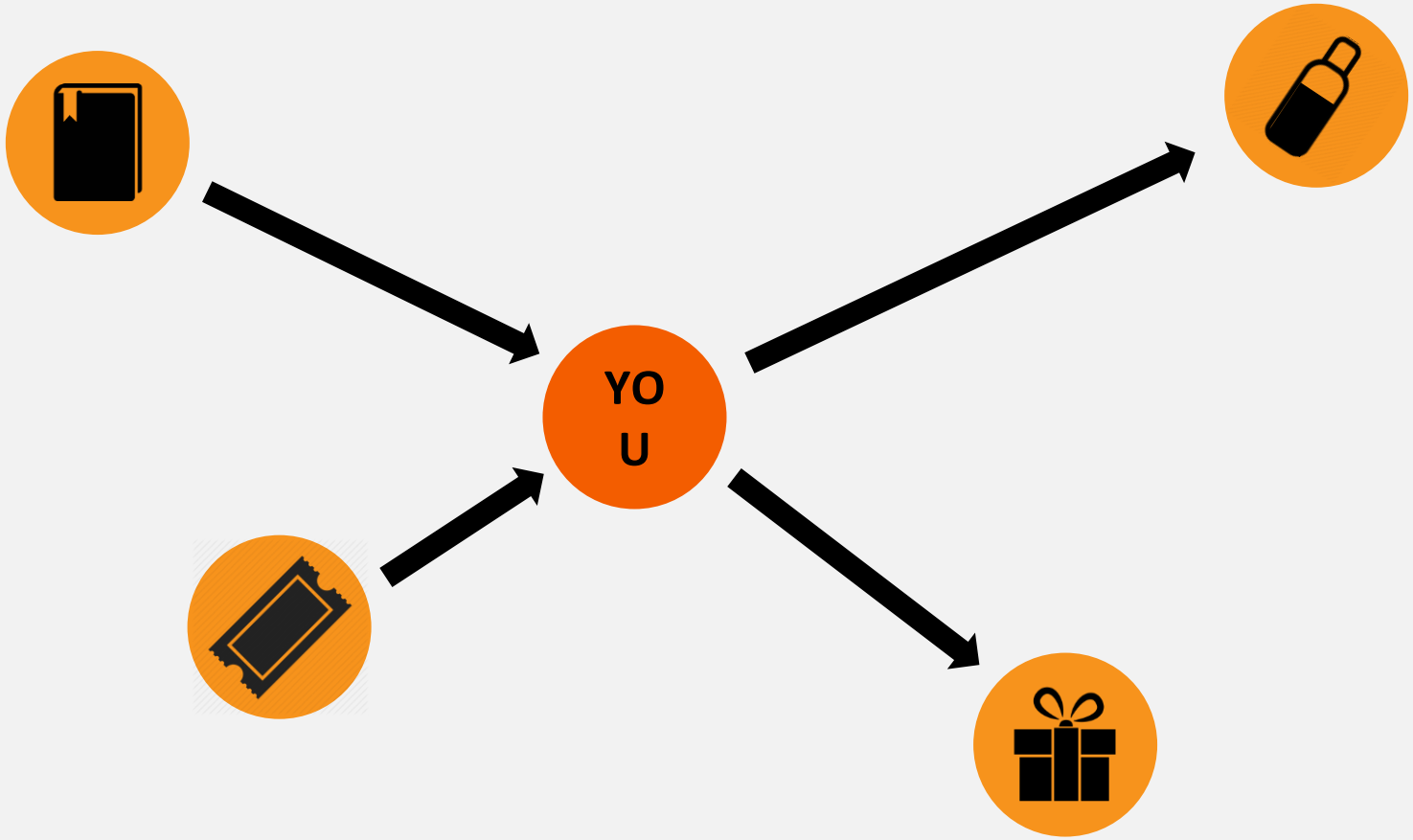


Source: **“Public Perceptions of Privacy and Security in the Post-Snowden Era”, by PewResearchCenter**

Fungibility

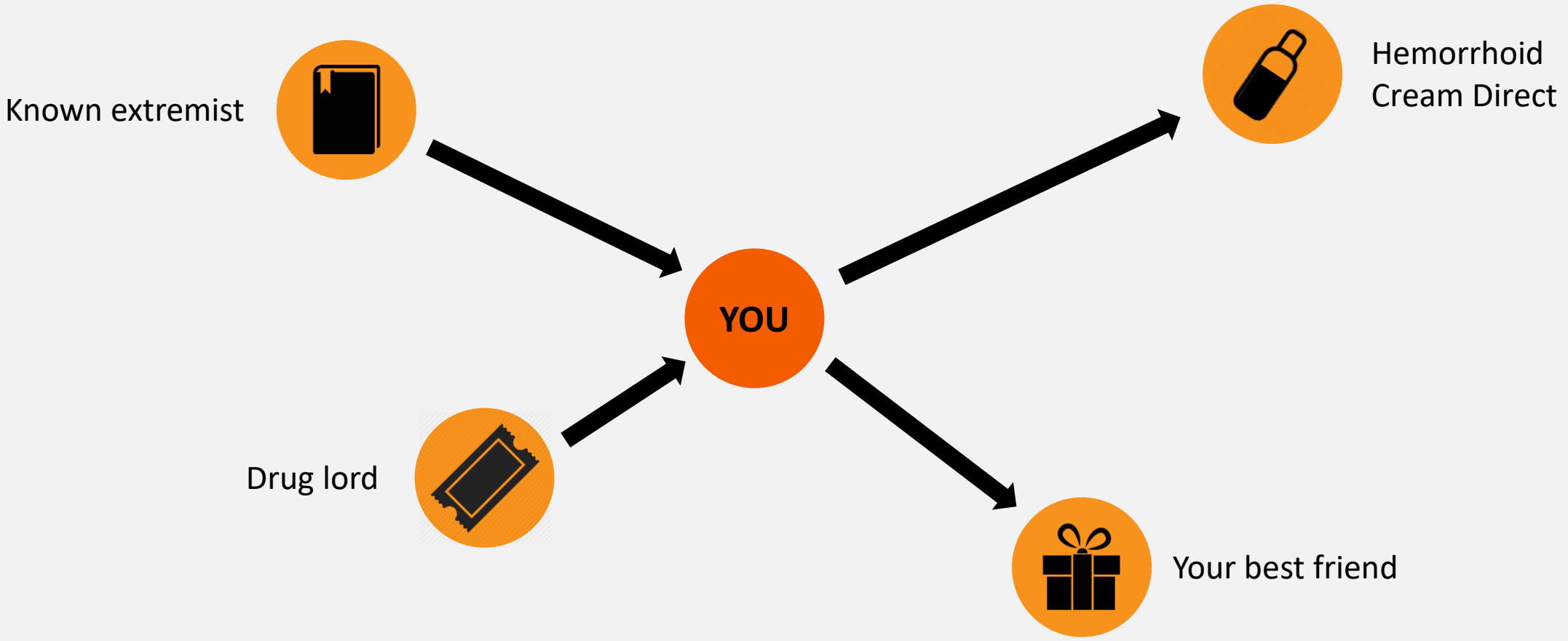
=

Why Fungibility Matters



Adapted from Keybase.io

Why Fungibility Matters



Adapted from Keybase.io

History of Privacy

In the beginning, people thought Bitcoin was private because addresses did not directly reveal any information about the controller

History of Privacy

Bitcoin address can be connected to personal info by:

- Exchanges
- Whoever you send Bitcoin to
- Whoever sends Bitcoin to you

History of Privacy

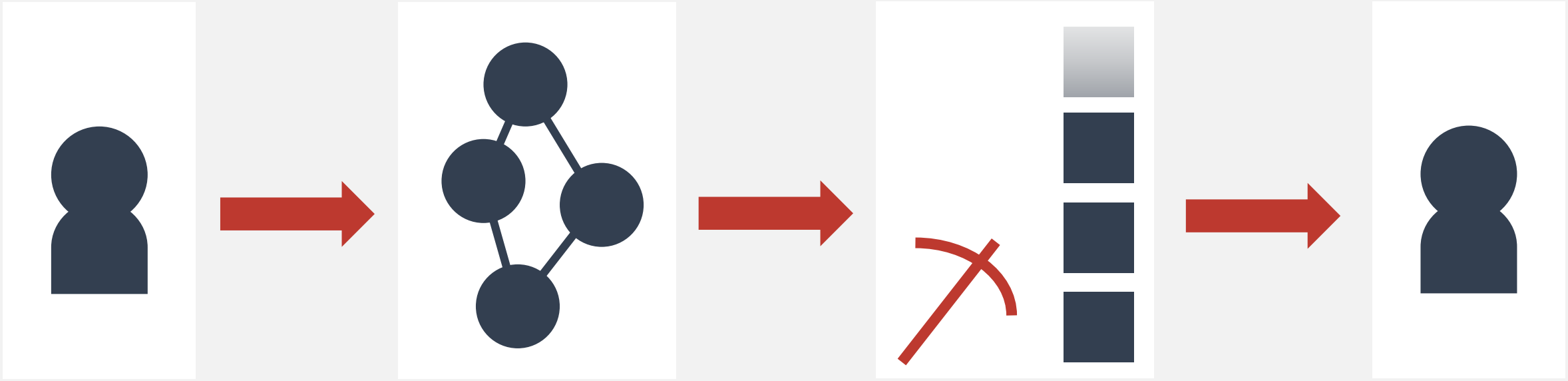
Bitcoin distribution

Balance	Addresses	% Addresses (Total)	Coins	$USD	% Coins (Total)
0 - 0.001	8180704	55.2% (100%)	1,614 BTC	2,058,220 USD	0.01% (100%)
0.001 - 0.01	2583261	17.43% (44.8%)	9,604 BTC	12,245,594 USD	0.06% (99.99%)
0.01 - 0.1	2425586	16.37% (27.37%)	74,829 BTC	95,411,062 USD	0.46% (99.93%)
0.1 - 1	1058542	7.14% (11%)	343,133 BTC	437,511,094 USD	2.11% (99.47%)
1 - 10	420755	2.84% (3.86%)	1,178,041 BTC	1,502,058,403 USD	7.24% (97.36%)
10 - 100	132200	0.89% (1.02%)	4,395,669 BTC	5,604,687,739 USD	27% (90.13%)
100 - 1,000	16788	0.11% (0.13%)	3,833,164 BTC	4,887,466,923 USD	23.55% (63.13%)
1,000 - 10,000	1623	0.01% (0.01%)	3,326,075 BTC	4,240,904,571 USD	20.43% (39.58%)
10,000 - 100,000	113	0% (0%)	2,788,847 BTC	3,555,912,478 USD	17.13% (19.15%)
100,000 - 1,000,000	3	0% (0%)	328,590 BTC	418,968,086 USD	2.02% (2.02%)

Addresses richer than	1 USD	100 USD	1,000 USD	10,000 USD
#	7,058,151	1,795,797	639,981	169,942

Source: https://bitinfocharts.com/top-100-richest-bitcoin-addresses.html

Bitcoin Crash Course



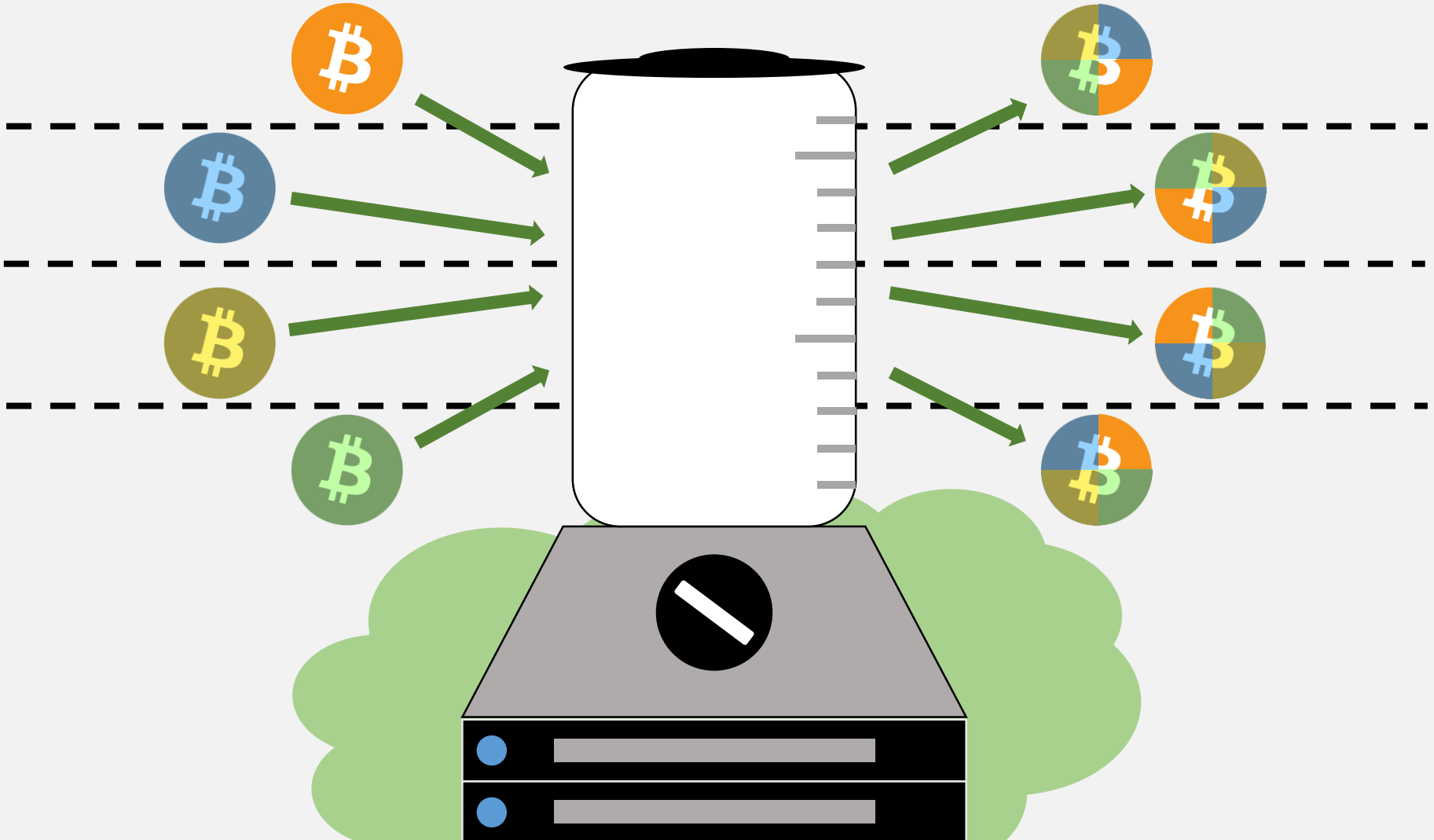
SENDER

TRANSACTION BROADCAST

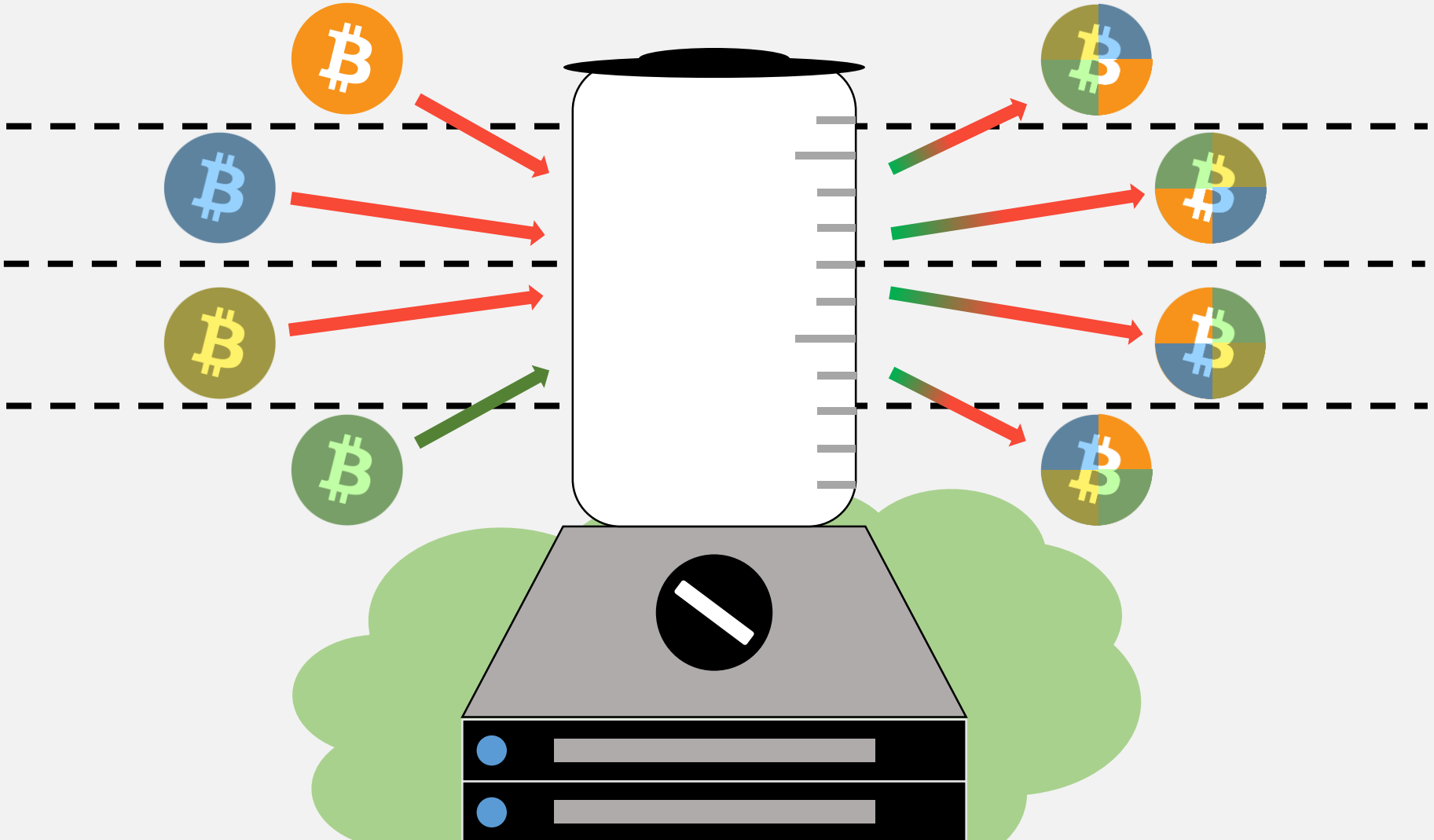
ADDED TO BLOCKCHAIN BY MINING

RECEIVER

People Started Adding Tools to Bitcoin

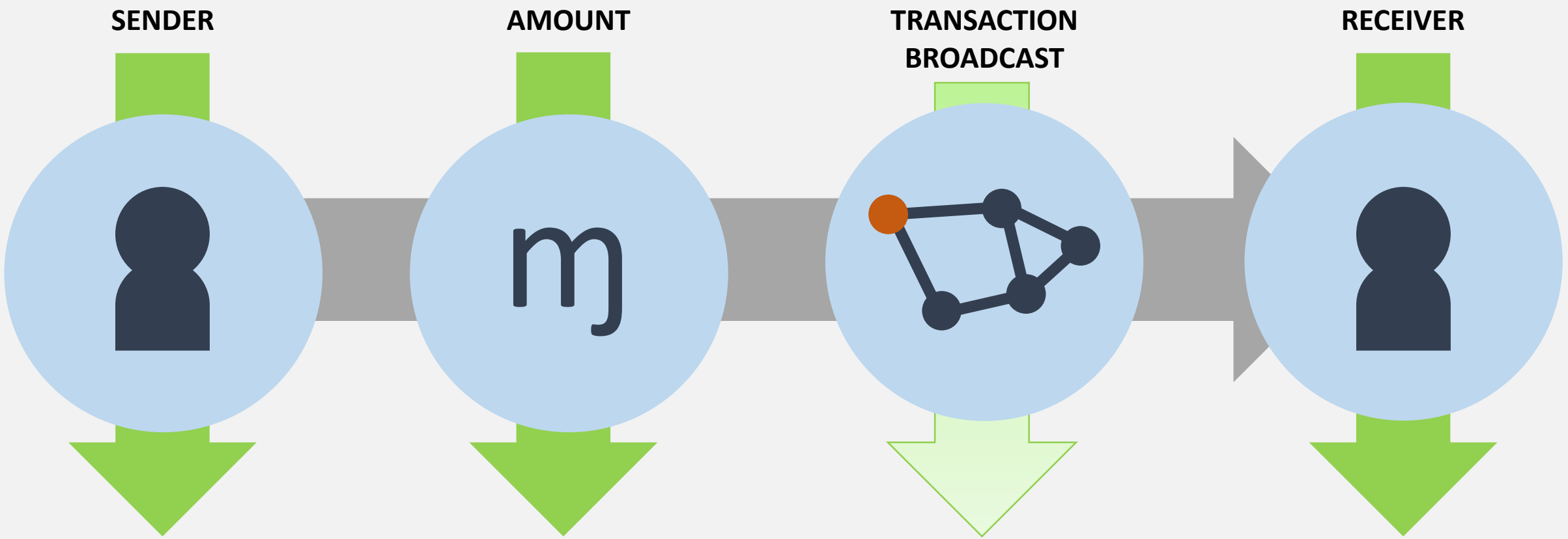


People Started Adding Tools to Bitcoin



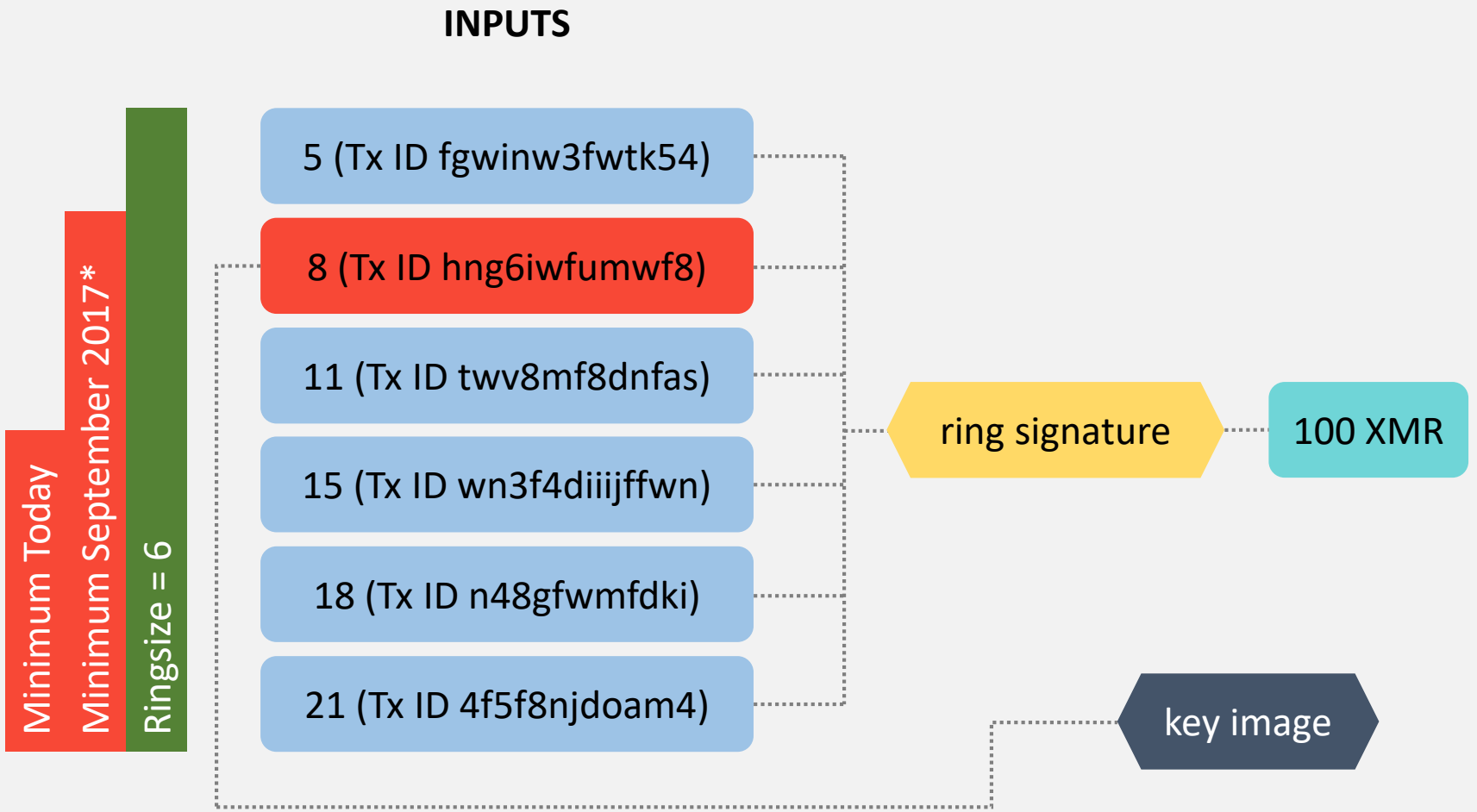
People Started Adding Tools to Bitcoin

The Monero Difference



Ring Signatures

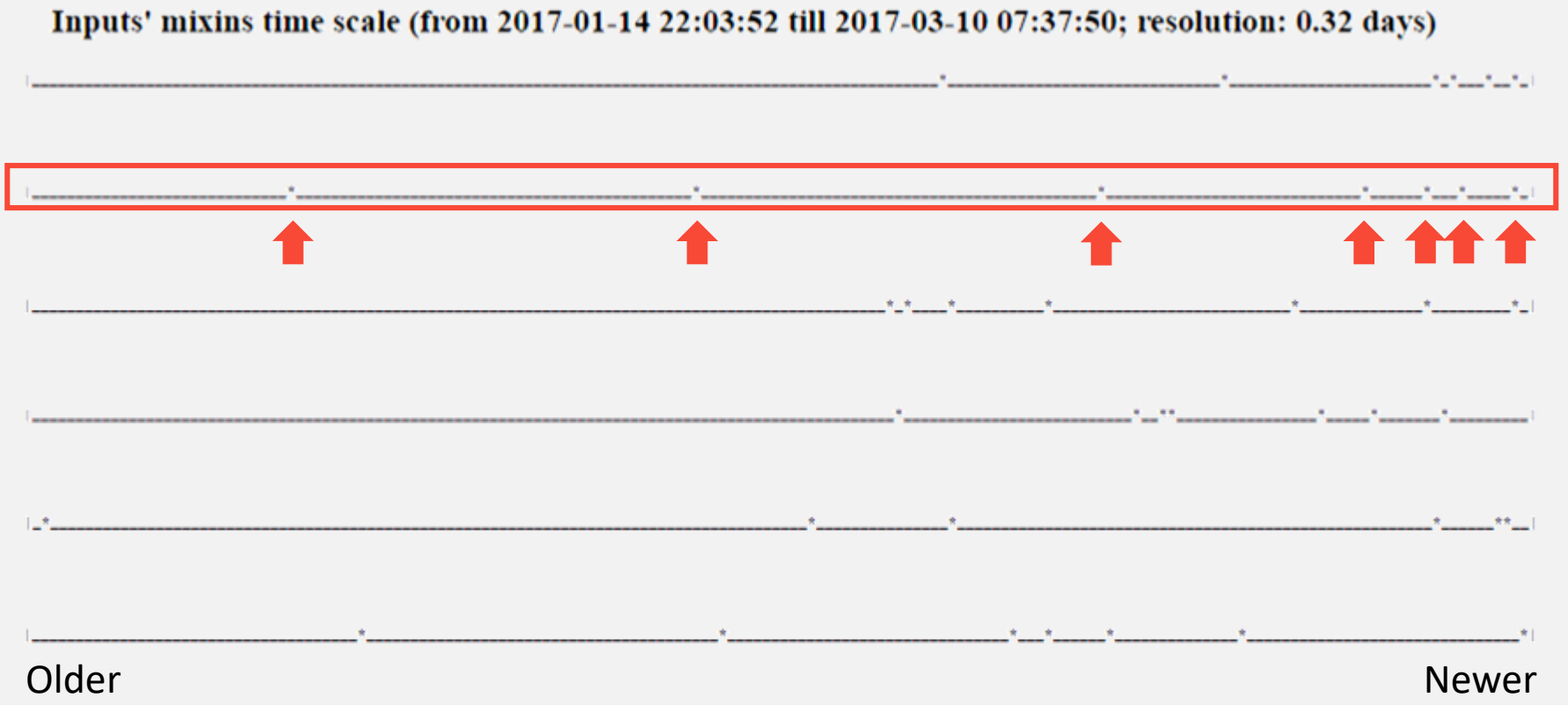
Ring Signatures



Ring Signatures

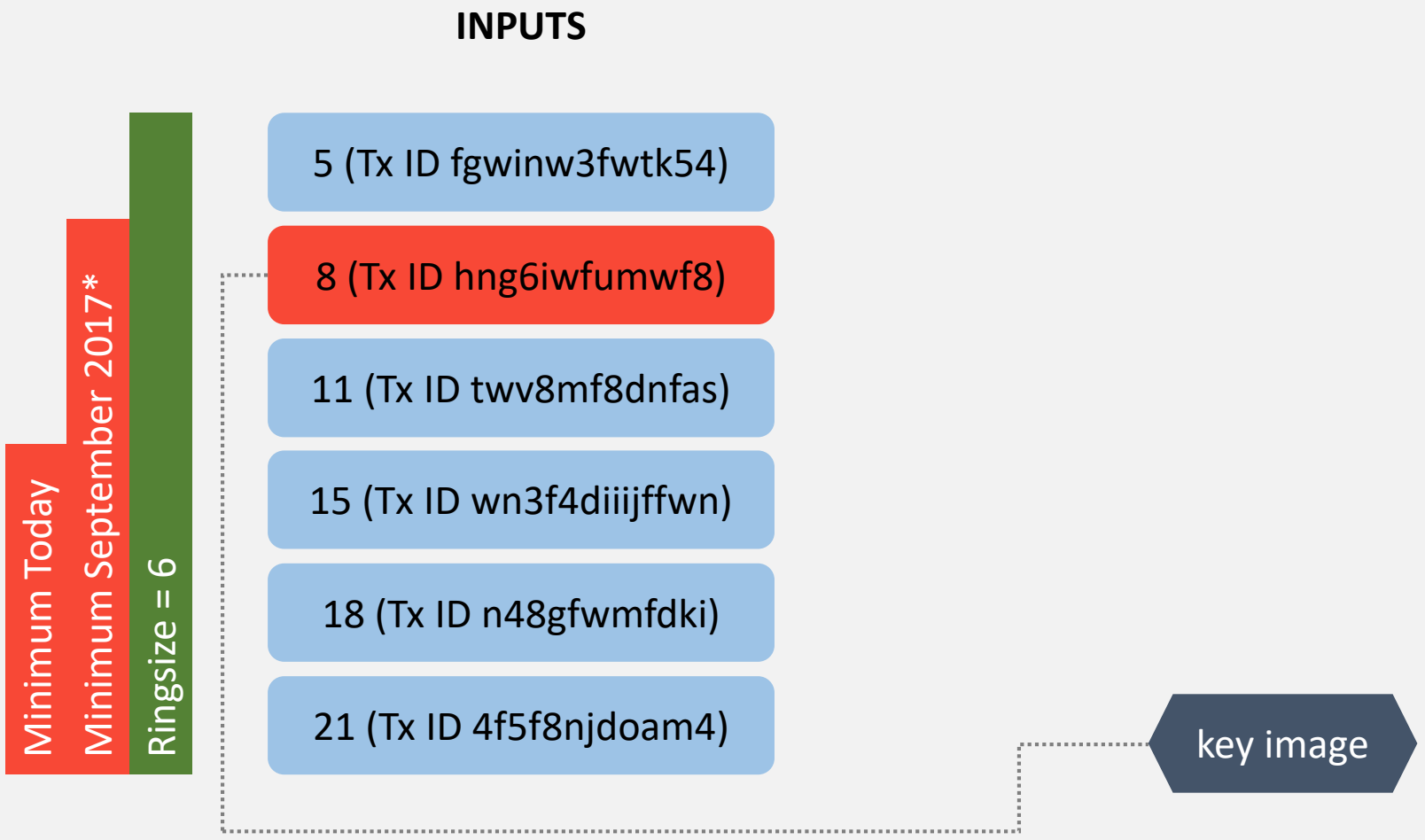
INPUTS

- 5
- 8
- 11
- 15
- 18
- 21



https://xmrchain.net/search?value=9bb608c70622ce67333c267103241f19b8aca21b7915f237813e451e1f03576e

Ring Confidential Transactions (RingCT)



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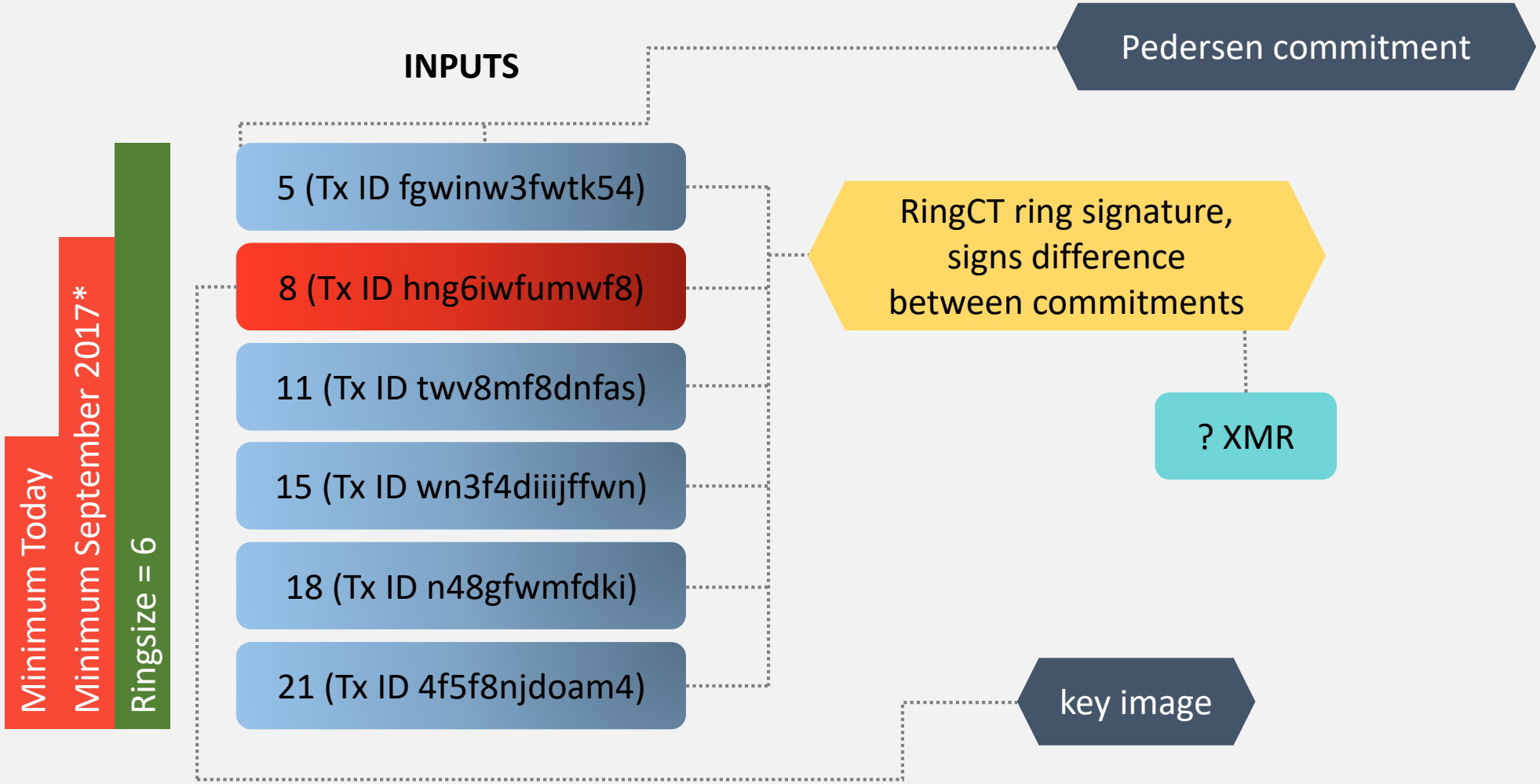


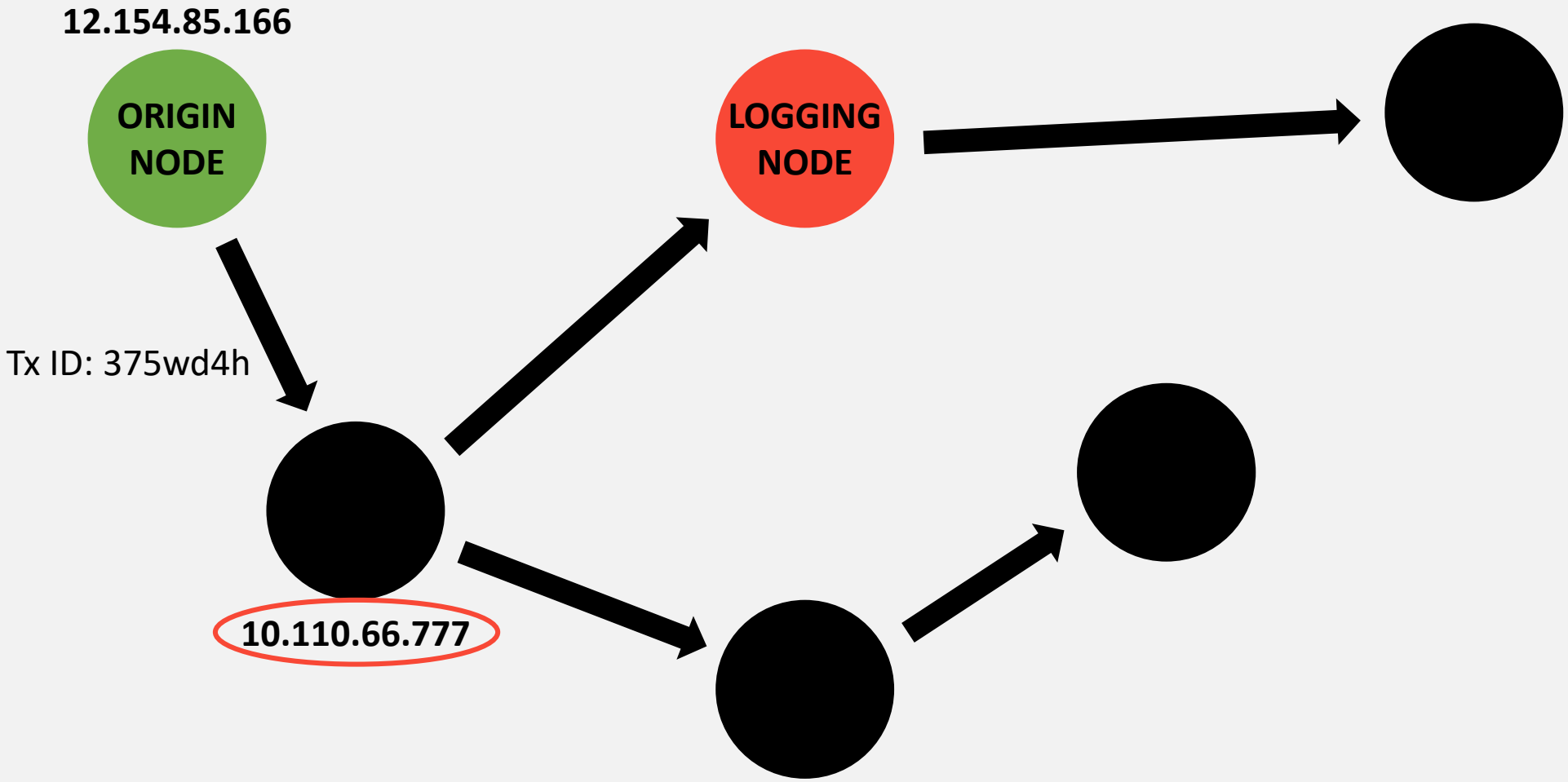
Ring Confidential Transactions (RingCT)

date	non ringct	ringct	ratio
2017-03-06	0	1944	100%
2017-03-05	0	2065	100%
2017-03-04	1	1859	99.95%
2017-03-03	2	2634	99.92%
2017-03-02	0	2579	100%
2017-03-01	0	2643	100%
2017-02-28	0	2446	100%
2017-02-27	1	2507	99.96%

Near 100% use of optional RingCT

Source: moneroblocks.info/stats

KOVRI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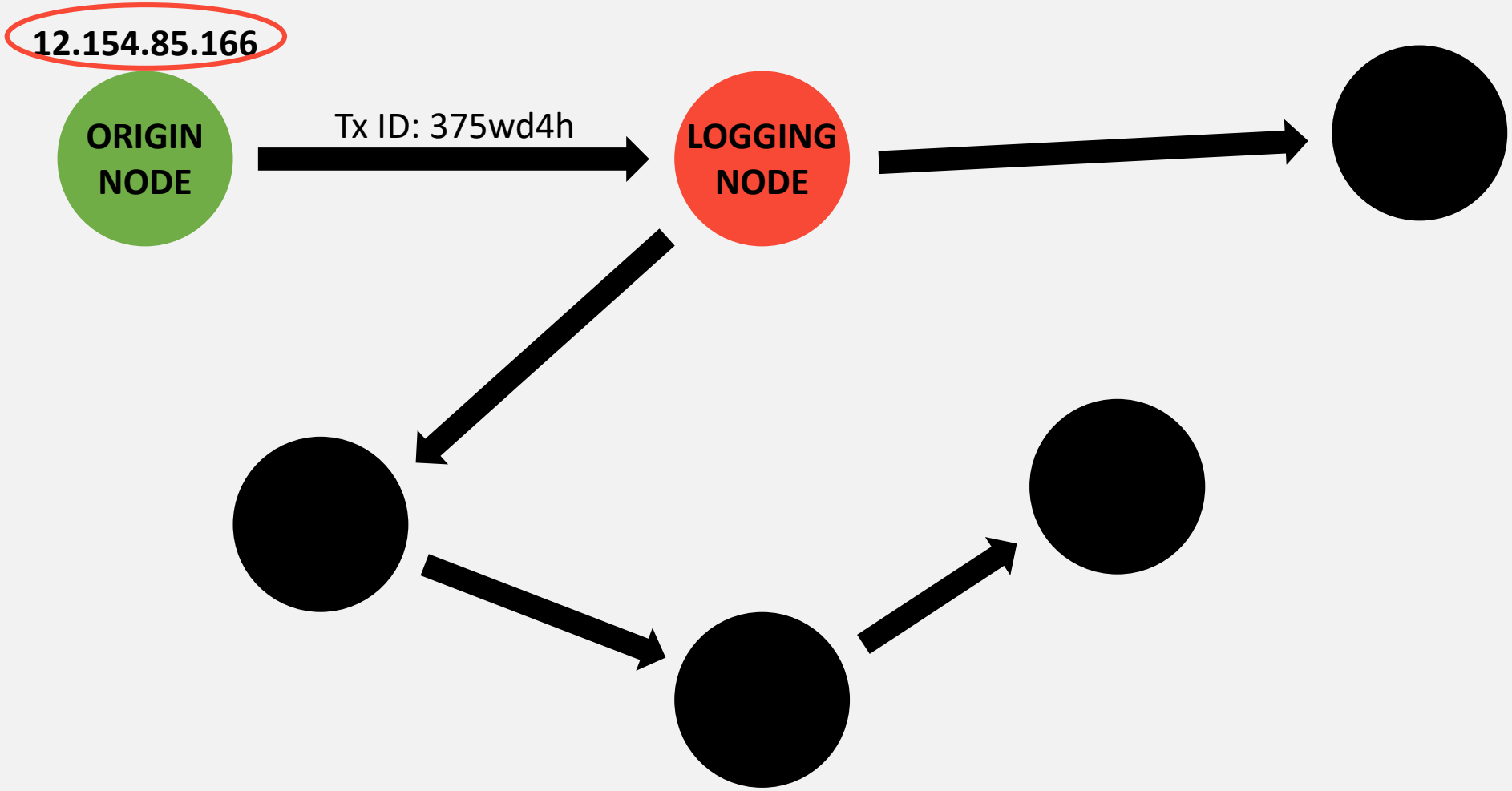
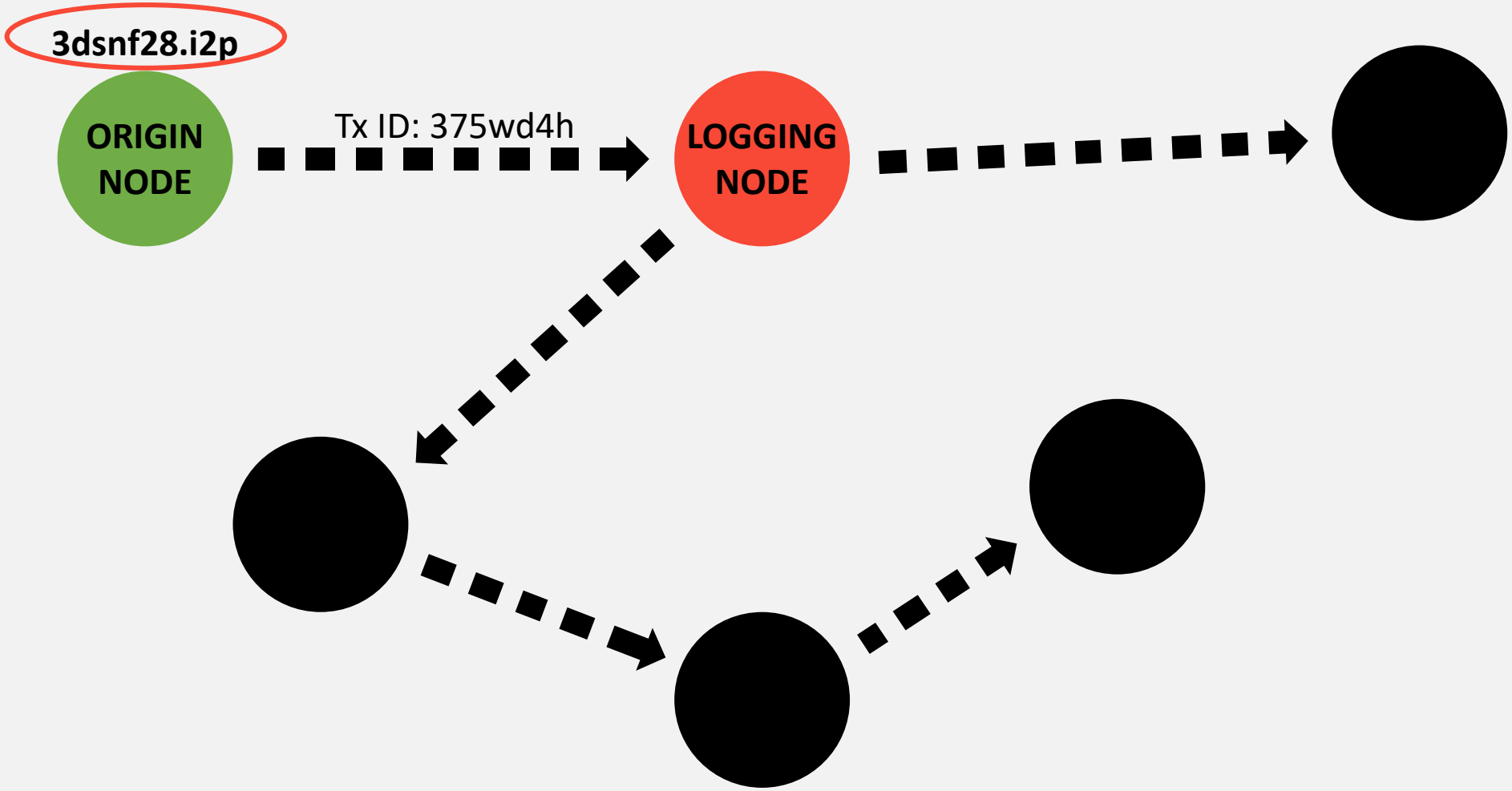
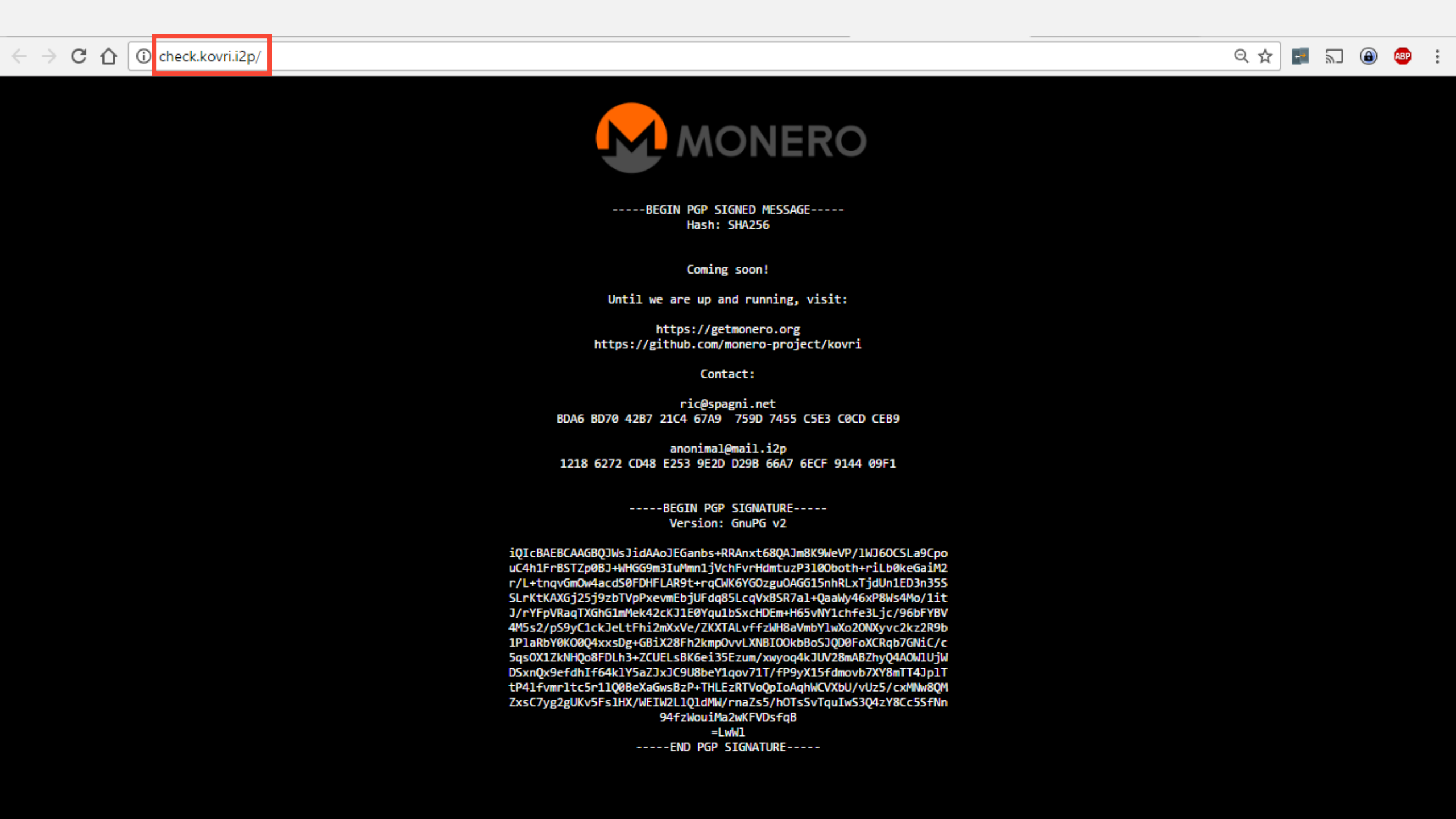
ORIGIN NODE
LOGGING NODE
Tx ID: 375wd4h
10.110.66.777

KOVRI



KOVRI




check.kovri.i2p/
MONERO
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Hash: SHA256
Coming soon!
Until we are up and running, visit:
https://getmonero.org
https://github.com/monero-project/kovri
Contact:
ric@spagni.net
BDA6 BD70 42B7 21C4 67A9 759D 7455 C5E3 C0CD CEB9
anonimal@mail.i2p
1218 6272 CD48 E253 9E2D D29B 66A7 6ECF 9144 09F1
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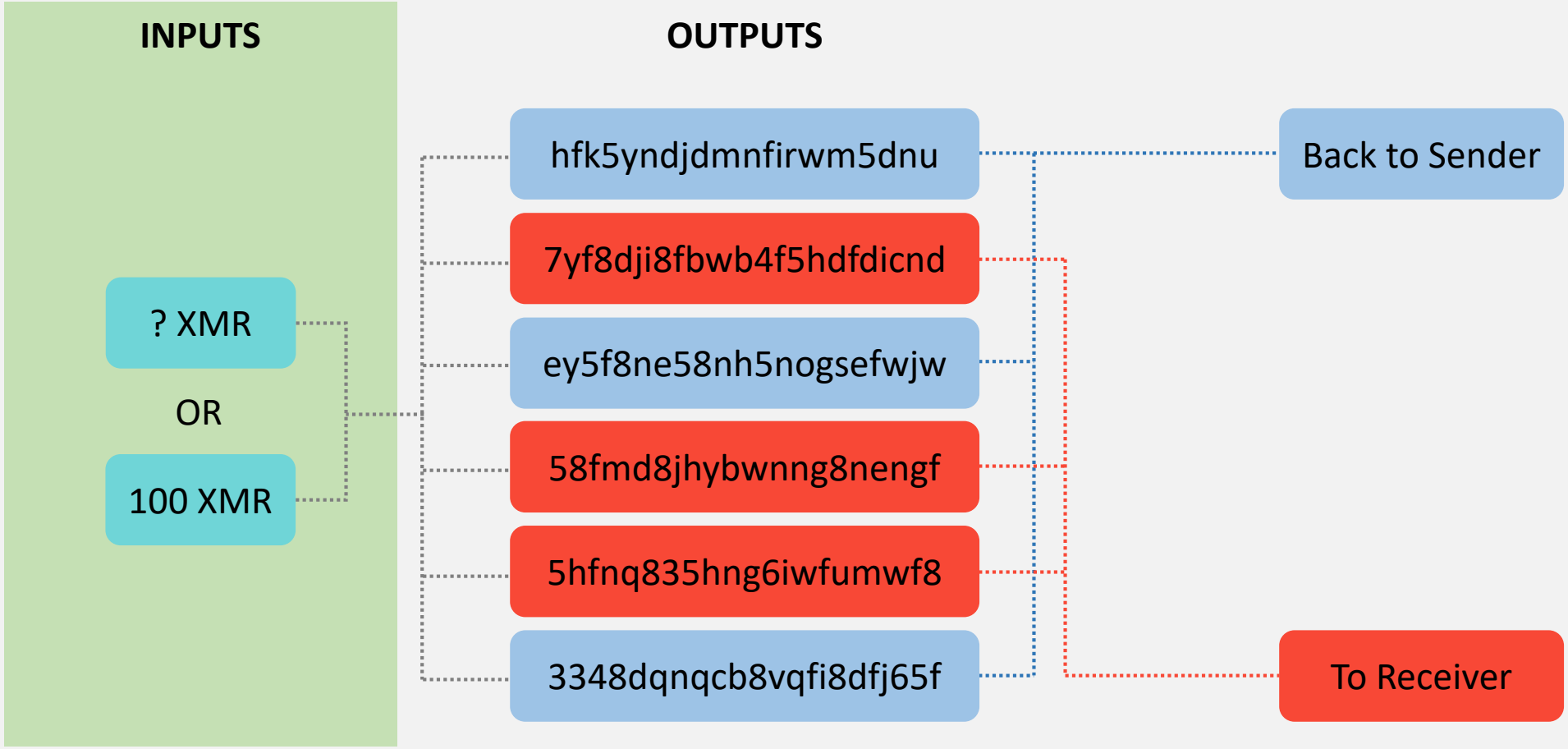
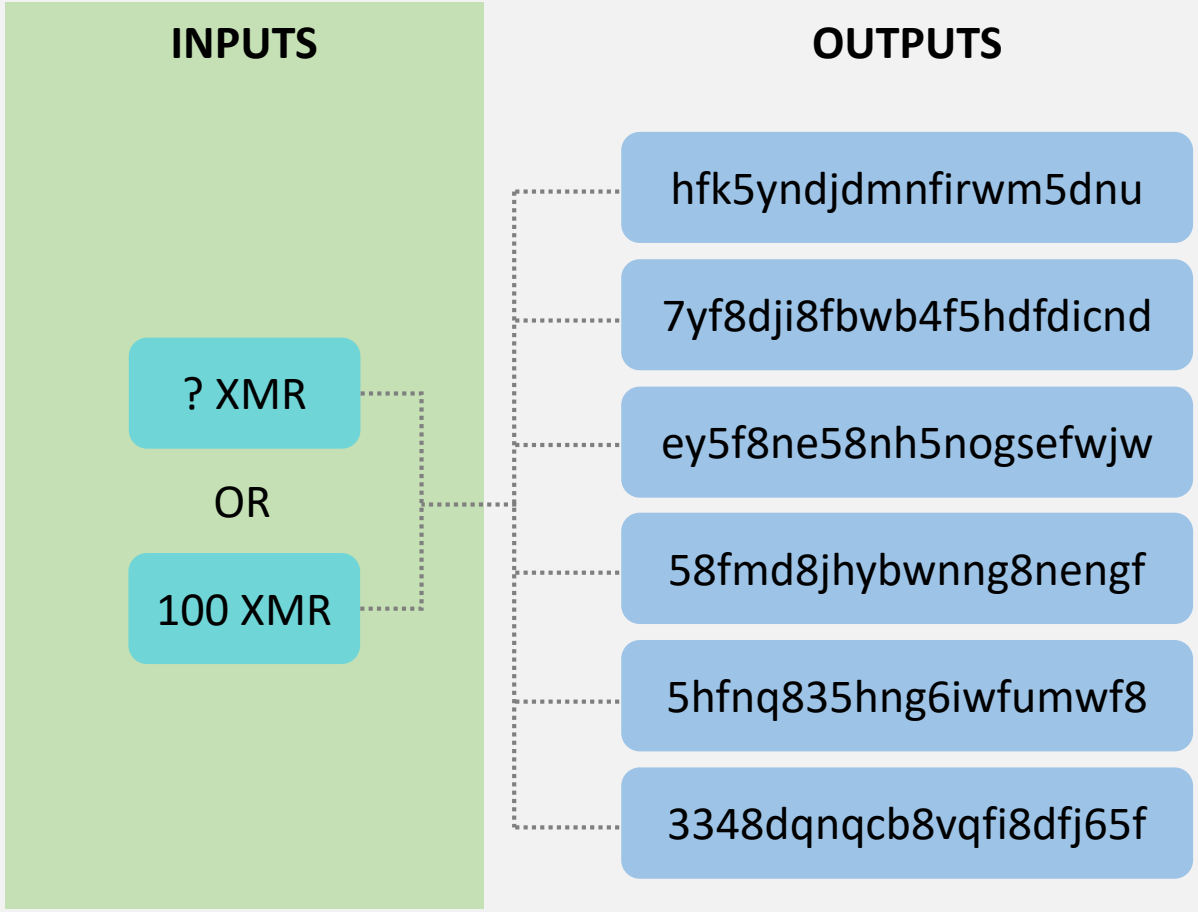
=LwWl
-----END PGP SIGNATURE-----

Stealth Addresses



Stealth Addresses

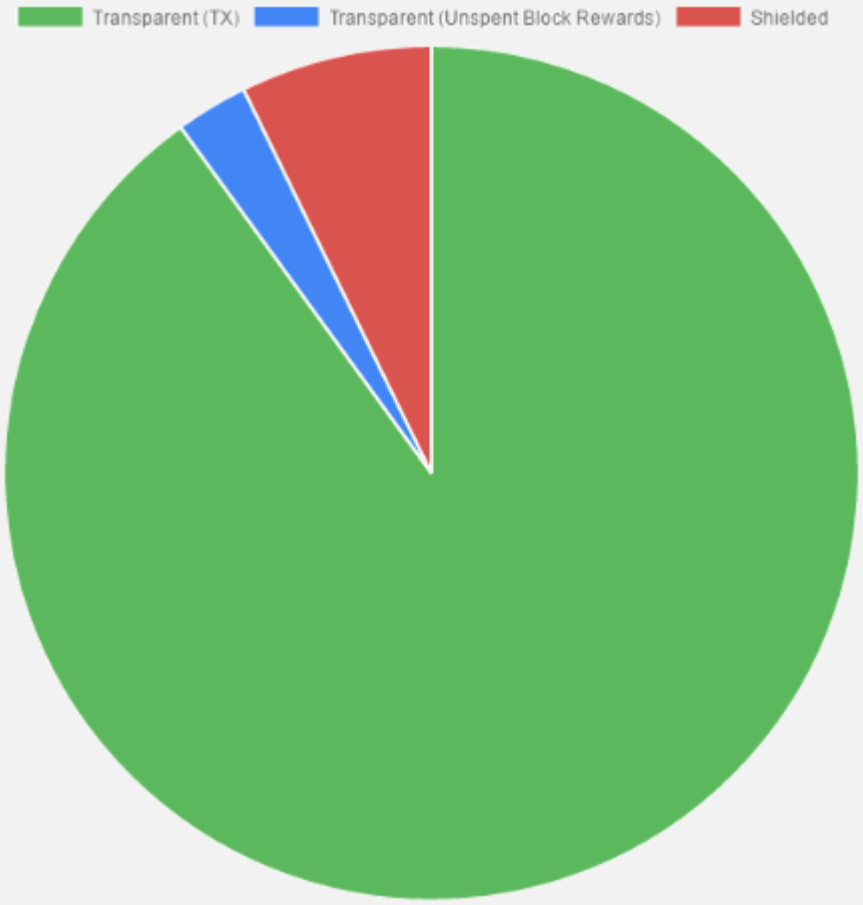


Mandatory Privacy

mixins used in transactions (%)

mixin:	none :(	1 - 2	3 - 9
last day	66.74	10.95	20.25
last week	66.11	6.96	24.76
last month	64.47	5.42	28.13
last year	73.04	7.36	18.16

Source: MoneroBlocks.info 24 Feb 2016



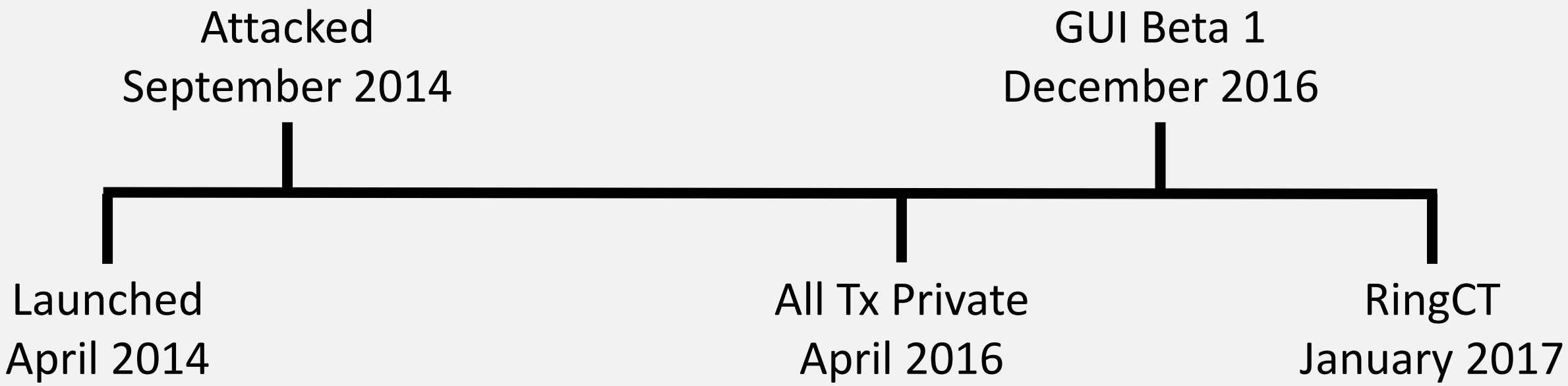
Source: zcha.in 15 March 2017

Evaluating Privacy Technology

Monero contributors know that our code:

- Is responsible for securing people's money
- May need to protect someone's life savings
- May need to keep an innocent person out of jail
- May mean the difference between life or death

A Brief History

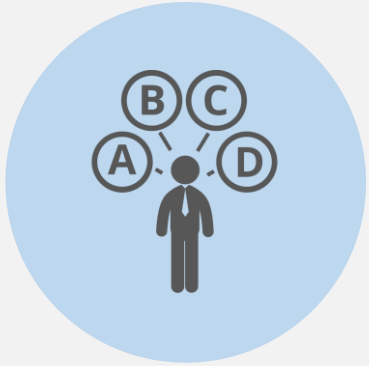


Regulatory Compliance and Transparency

(with the View Key)

Transparency

A view key is used to reveal all transactions for a Monero account, or just the key for a single transaction



Selected Parties

View keys can be given to selected parties, or can be made public

Auditing

Auditors can be given access to accounts without being able to spend those account funds

Charities

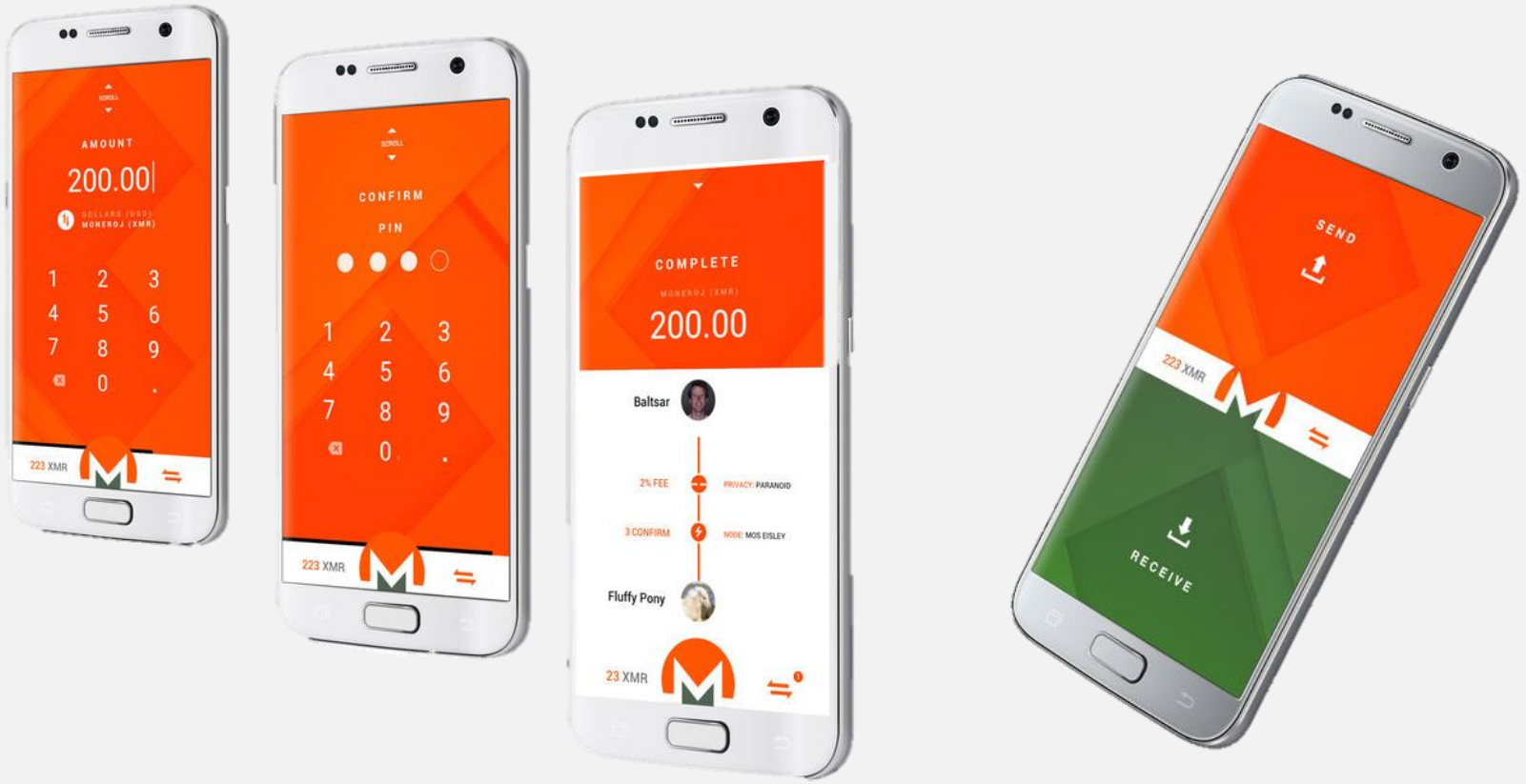
By publishing their view key, charities can invite easy public oversight

Parents

Children can be given their own accounts, and parents can monitor their spending

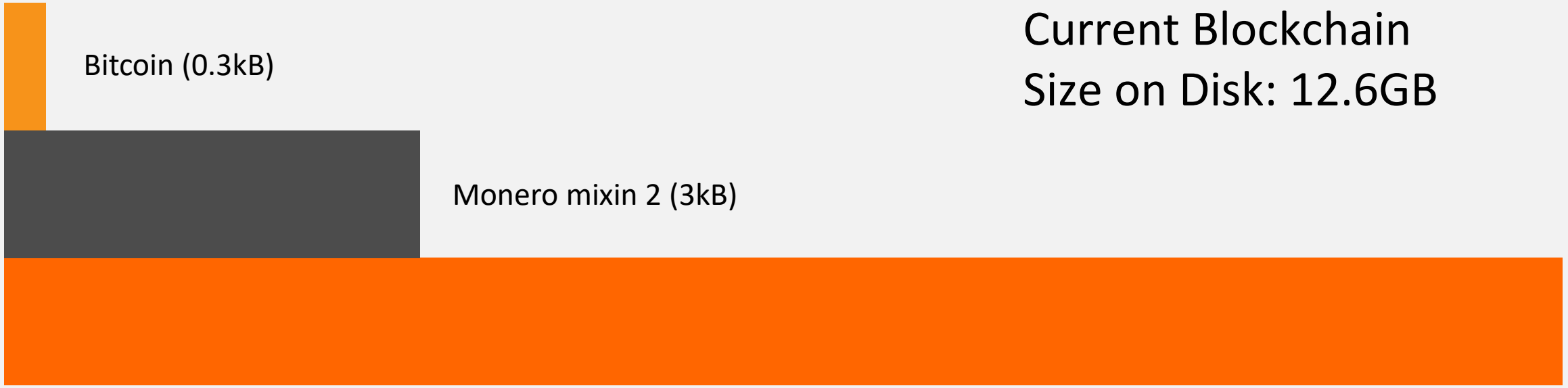
Monero Limitations

Monero Limitations



Monero Limitations

Monero Limitations

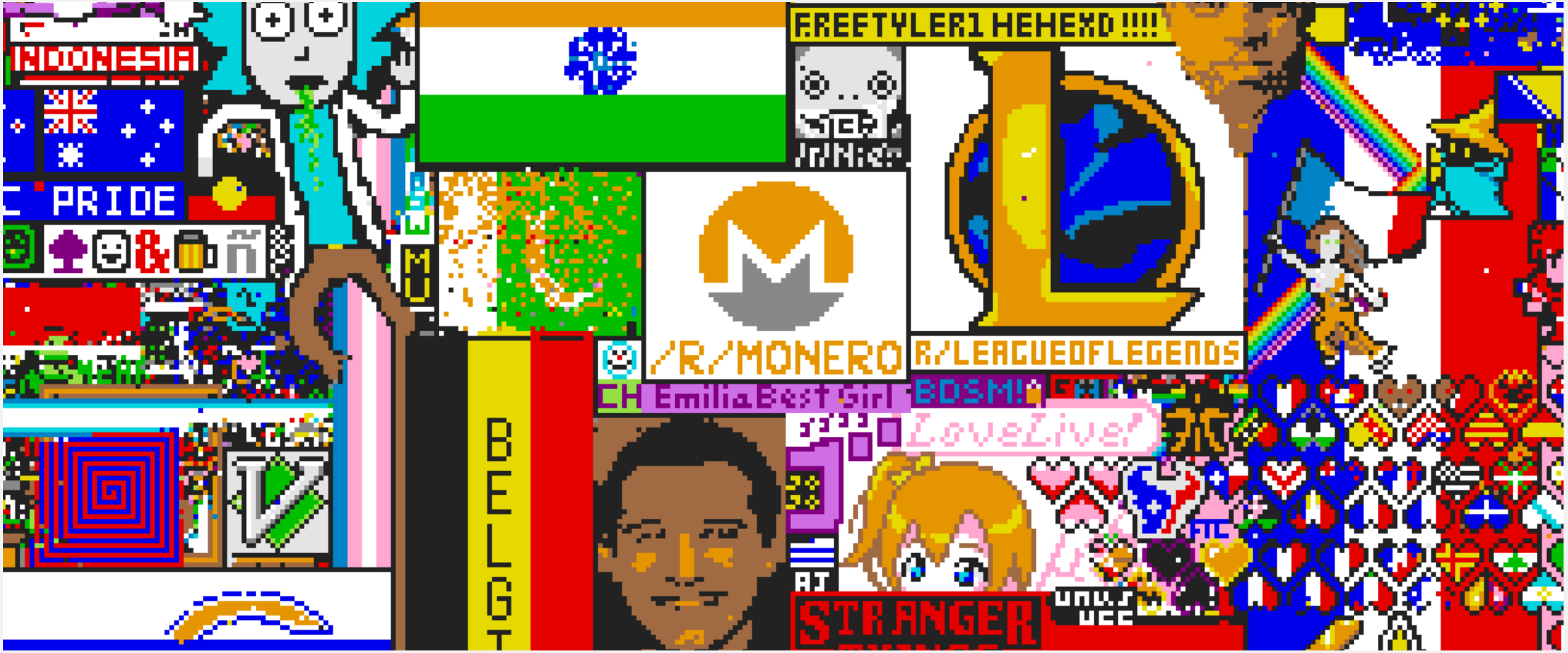


Current Blockchain
Size on Disk: 12.6GB

Addressing Transaction Size

1. Large hard drives are cheap, and prices continue to fall (even if it can't meet Moore's Law)
2. Prune non-essential parts of blockchain for 50% size reduction. Sharding possible
3. RingCT is brand new; optimizations could reduce transaction sizes by 20%
4. Any real scaling needs to be done off-chain anyway

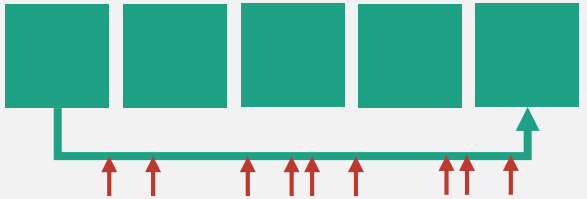
Roadmap and Ongoing Development



Roadmap and Ongoing Development

Multisig

Improvements to Dynamic Fees & Dynamic Blocks



Second Layer Network

Translations

Hardfork Schedule

April 15th

- **Dynamic Block Improvements**
- **Dynamic Fee Improvements**
- Bug fixes

September 18th*

- **Mandatory RingCT**
- **Minimum ringsize ≥5**
- GUI improvements
- Fluffy blocks
- Wallet sync optimizations
- Bug fixes

Thank You!

getmonero.org

/r/Monero

monero.stackexchange.com