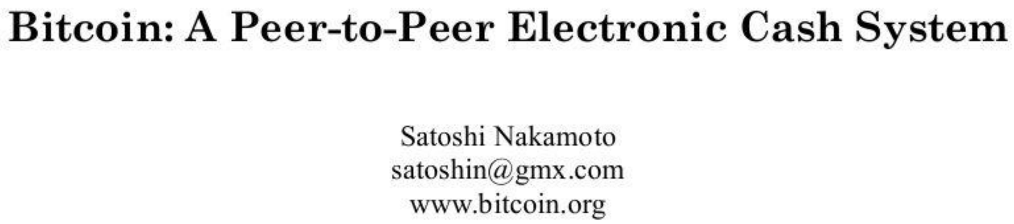
A Simple “Blockchain”

Roger Wattenhofer

A Simple Blockchain for Simple Applications



Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

“The problem of course is the payee can't verify that one of the owners did not double-spend the coin.”

“We need a system for participants to agree on a single history of the order in which [transactions] were received.”

no double-spending

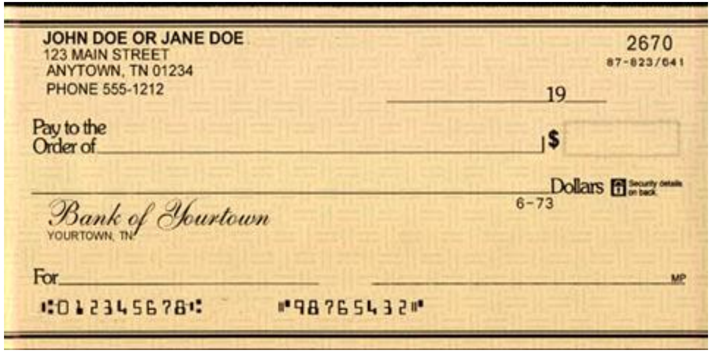
≠

single order

=

consensus

Double-Spending



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PHONE 555-1212

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87-823/641

19

Pay to the Order of $

Dollars Security details on back.

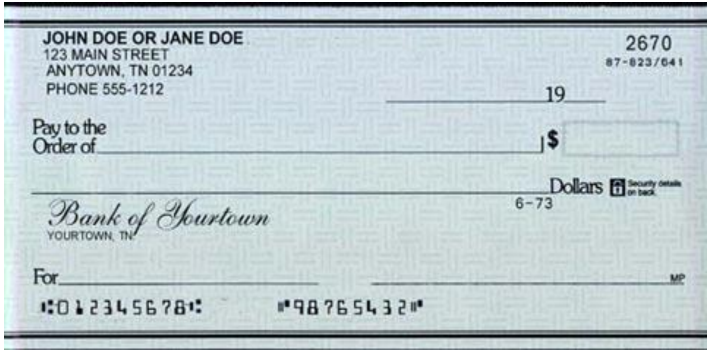
6-73

Bank of Yourtown
YOURTOWN, TN

For

MP

⑆012345678⑆ ⑈98765432⑈



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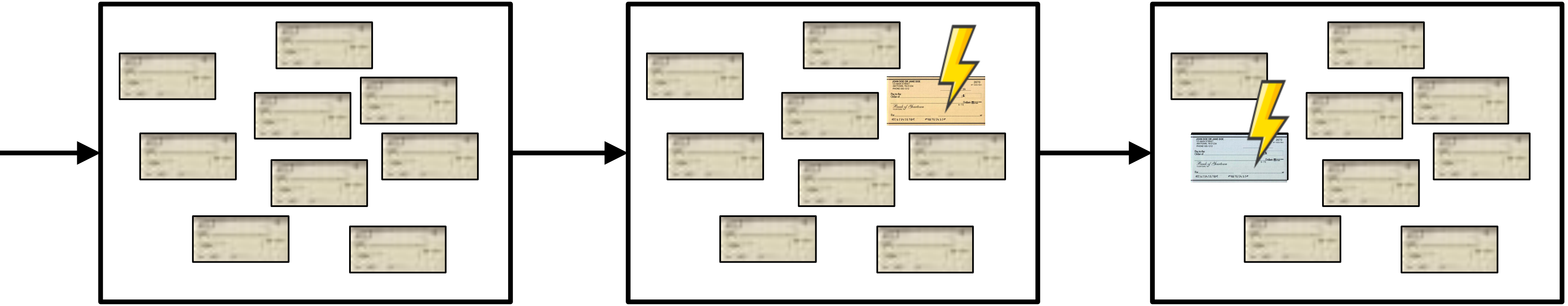
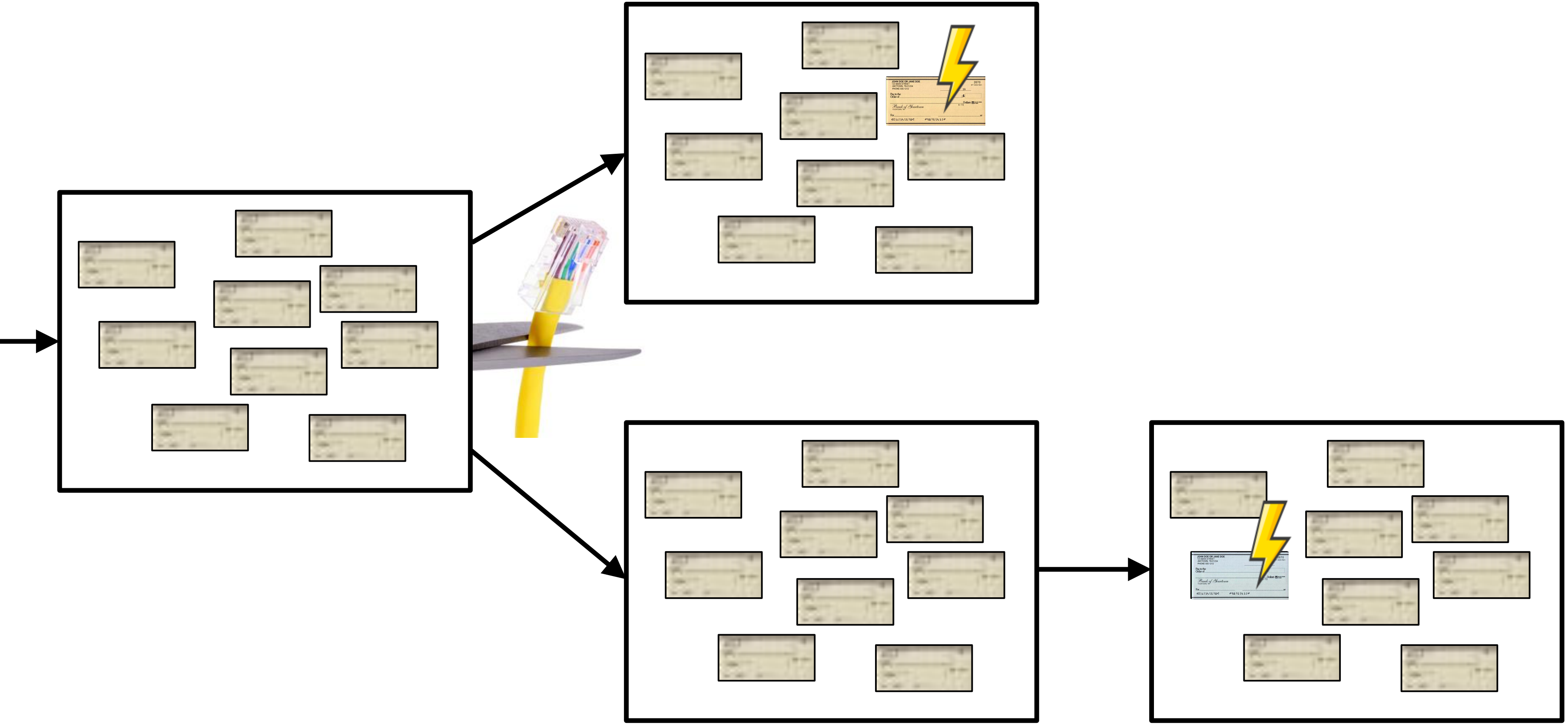
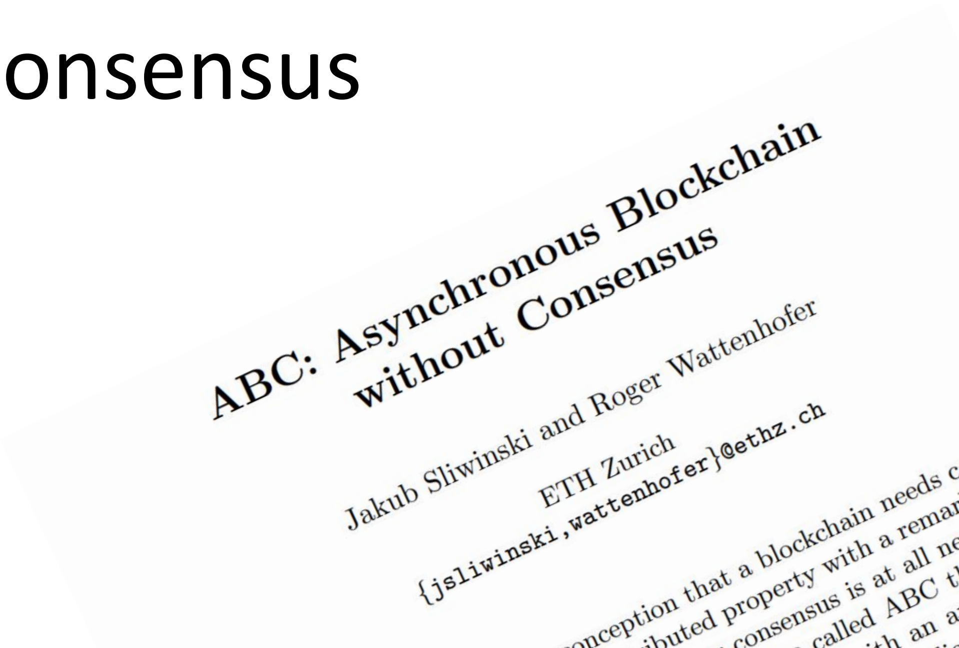
Blockchains Solve Double-Spending Problem



What About Network Outages?



Without Consensus



ABC: Asynchronous Blockchain without Consensus

Jakub Sliwinski and Roger Wattenhofer

ETH Zurich

{jsliwinski,wattenhofer}@ethz.ch

conception that a blockchain needs c
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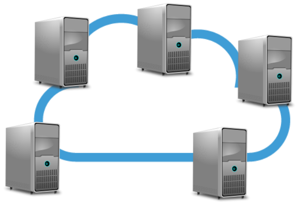
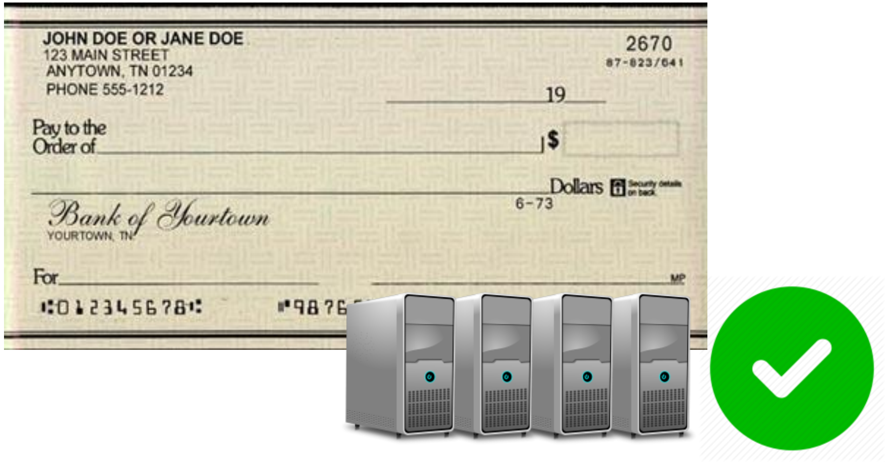
consensus is at all ne
called ABC t
ith an a

Permissioned Blockchain





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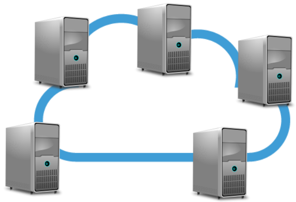
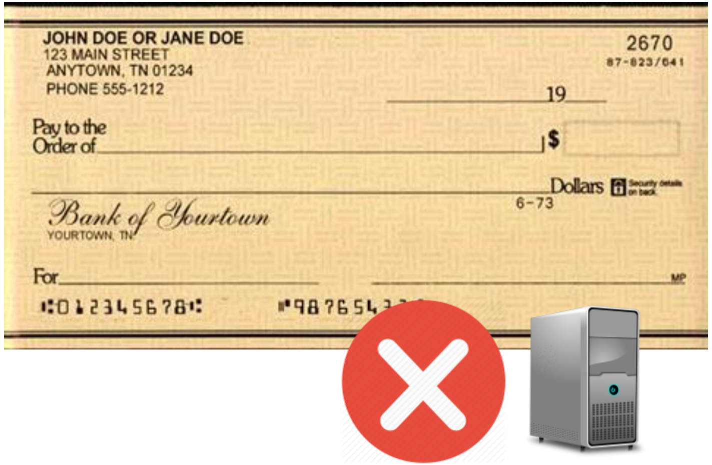
Needed: 4 out of 5 signatures

Permissioned Blockchain





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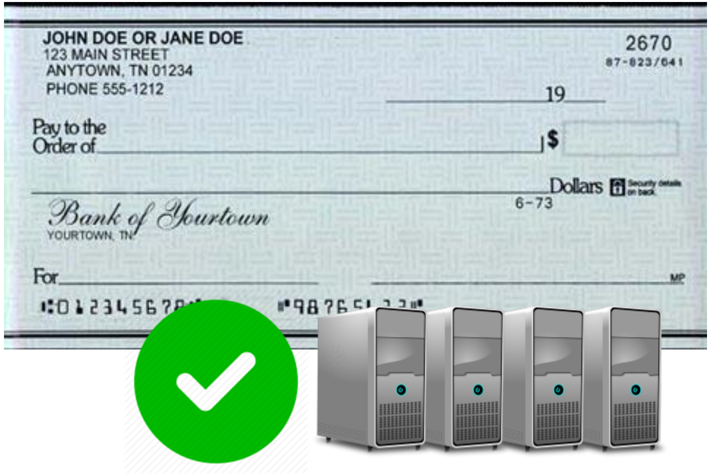

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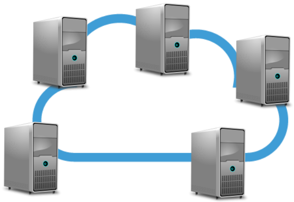
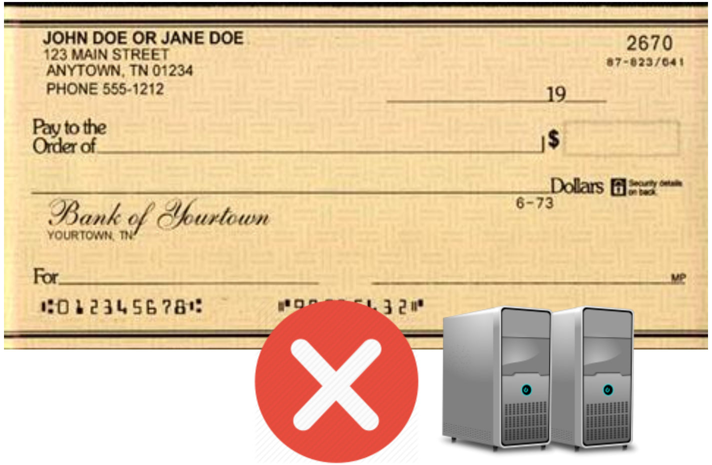
⑆0123456 ⑈98765

Permissioned Blockchain





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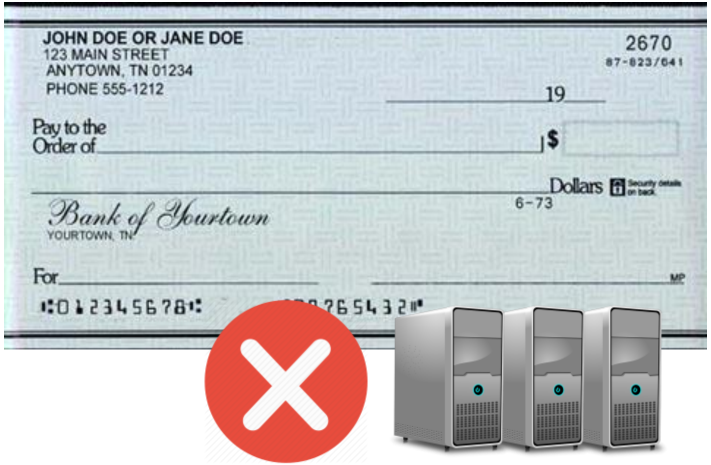
⑆0123456781⑆ ⑈98...5432⑈



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For

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⑆0123456781⑆ ...7654321⑈

Usual Safety Condition

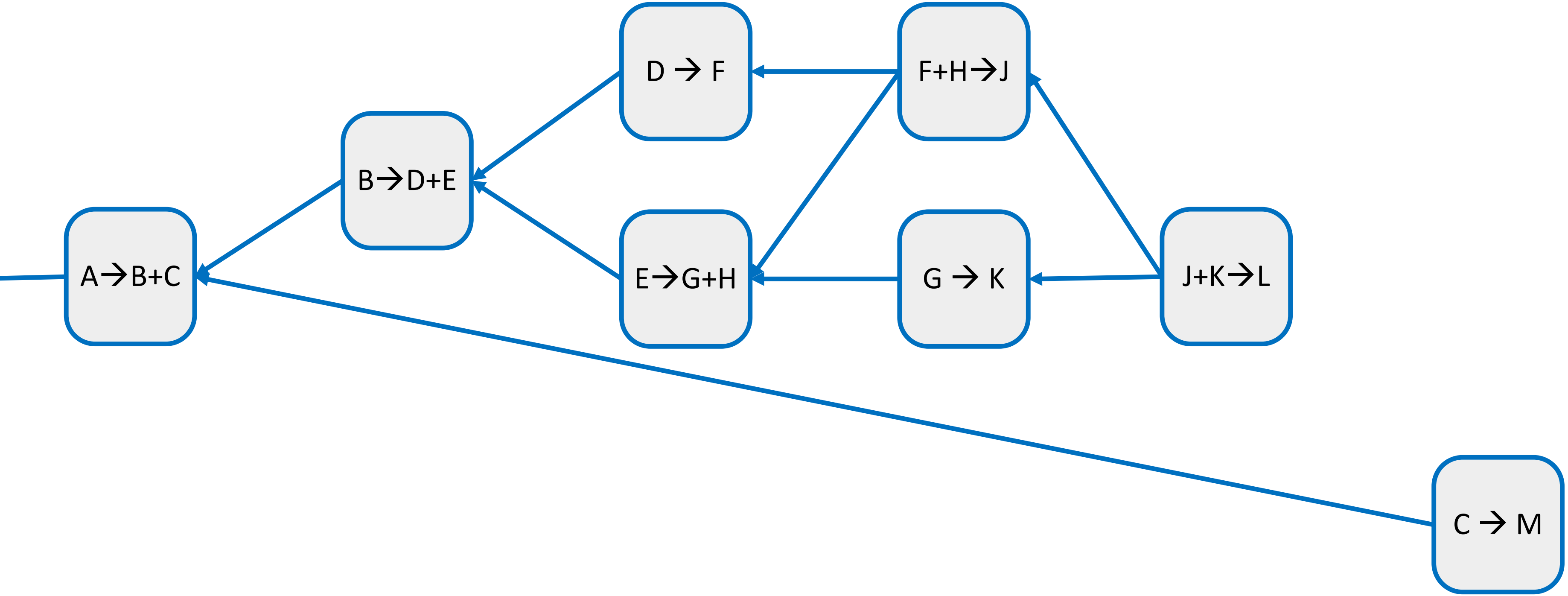
Less than 1/3 Malicious

Additional Condition

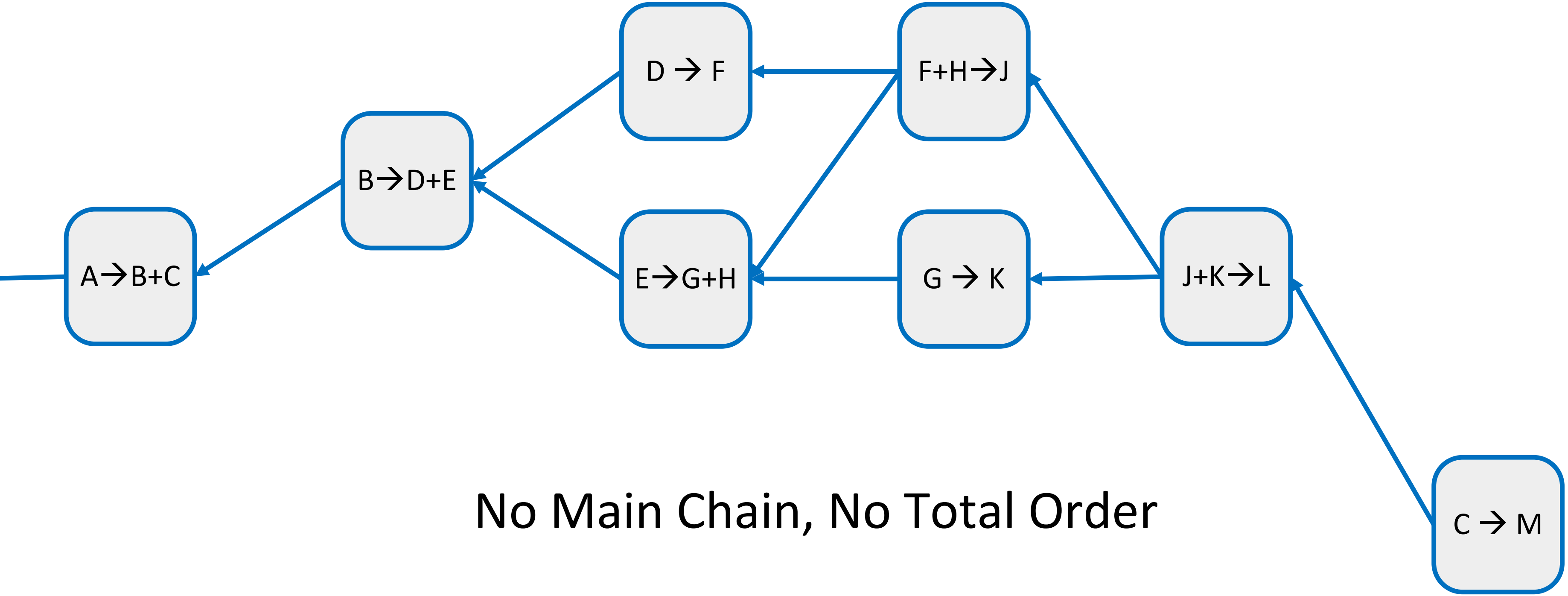
Single Owner Accounts*

*organized multi-owners, not fancy open-access smart contracts

Point to Money Source

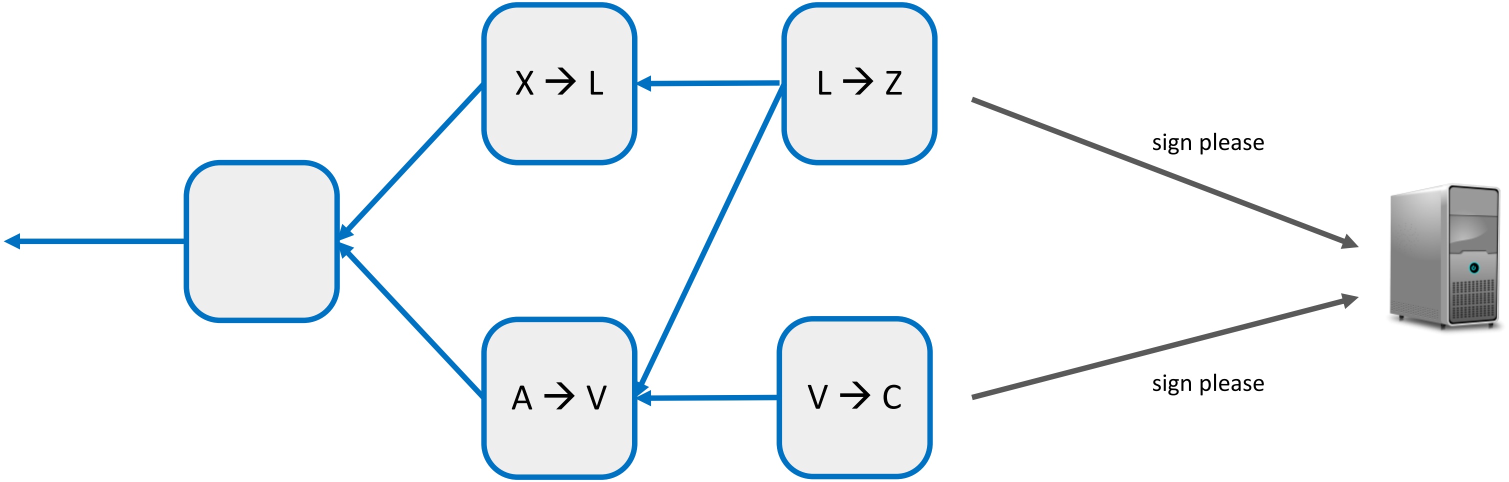


Point To All Transactions!

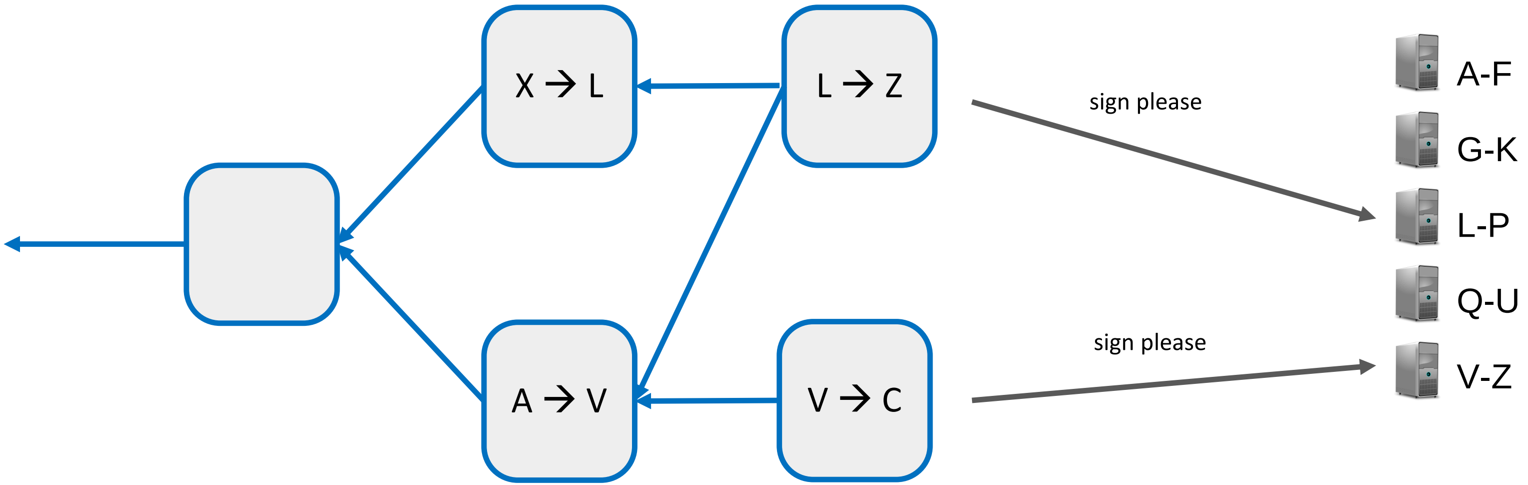


No Main Chain, No Total Order

Sharded Signing



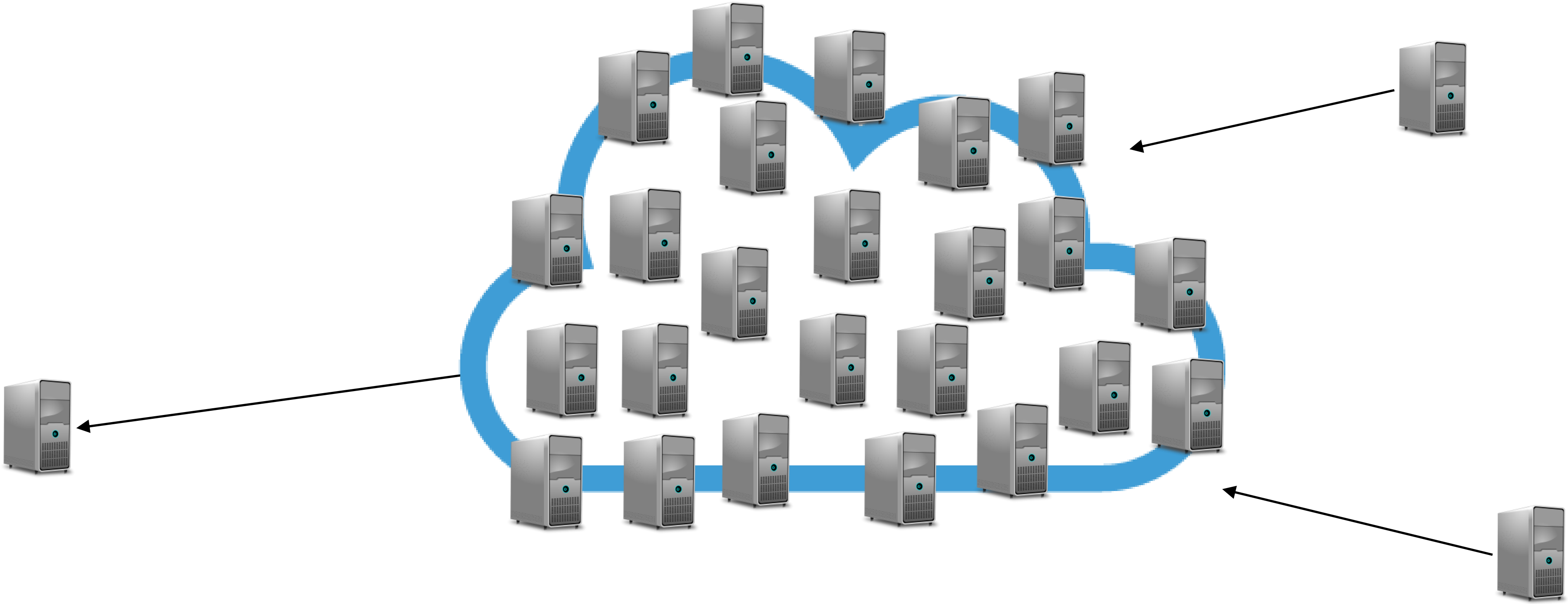
Sharded Signing

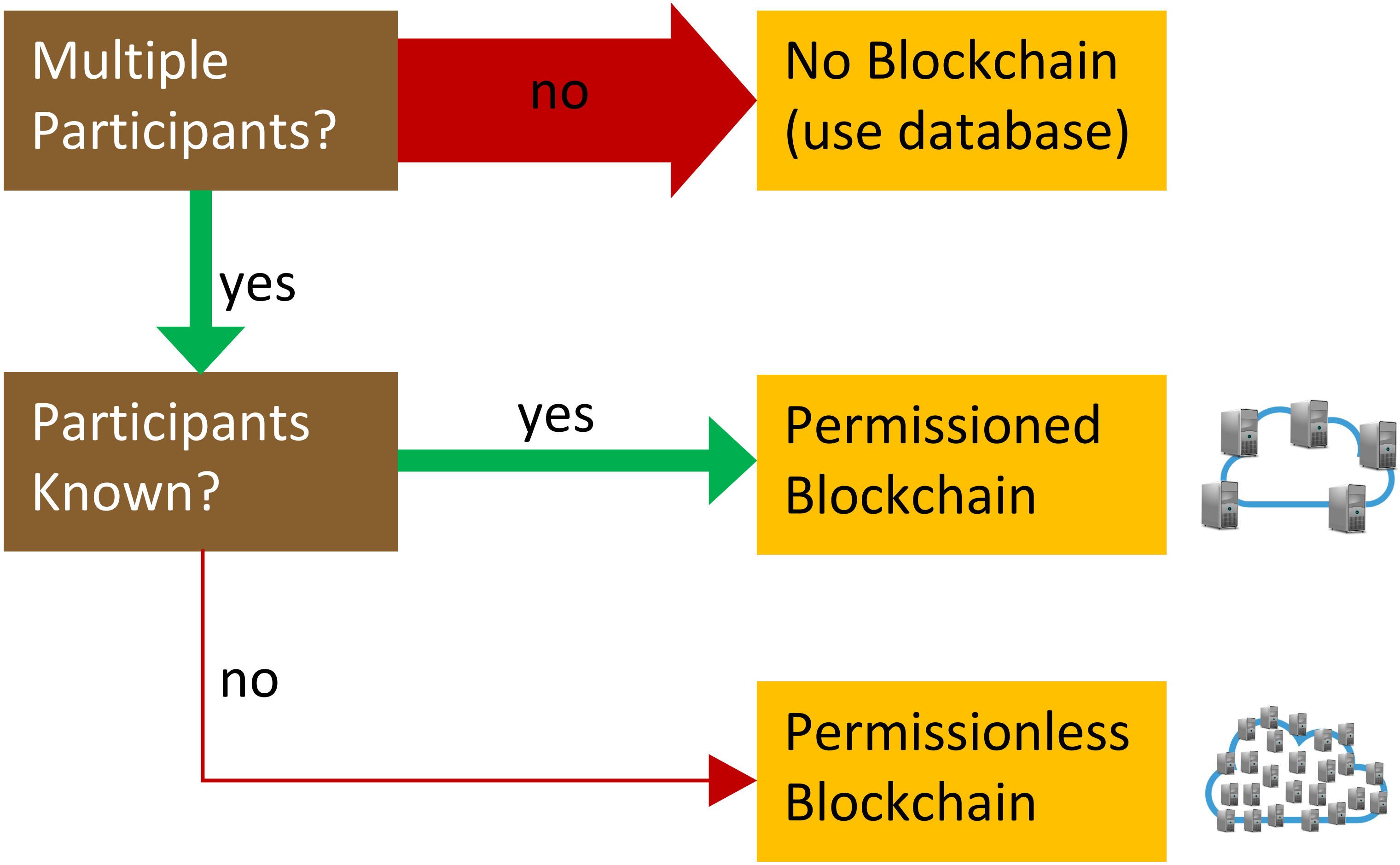


Also Permissionless?

(Without Proof-of-Work)

Permissionless / Open





Multiple Participants?

no

No Blockchain (use database)

yes

Participants Known?

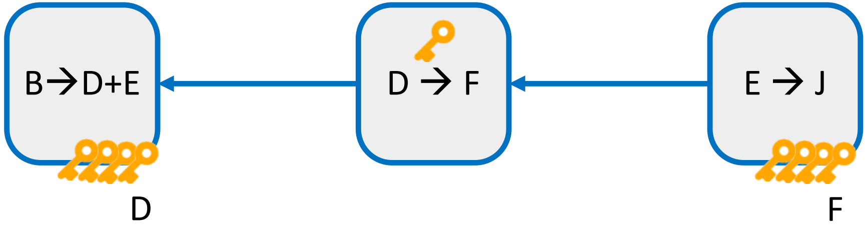
yes

Permissioned Blockchain

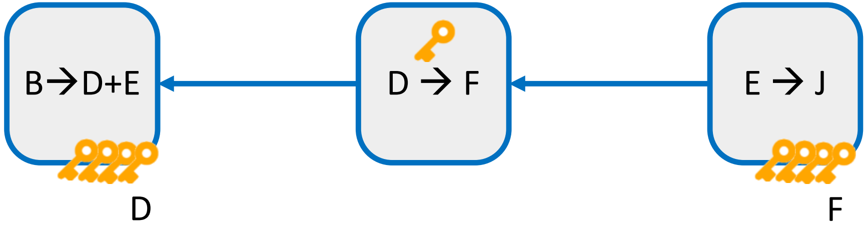
no

Permissionless Blockchain

1. Transferrable Signing Keys



1. Transferrable Signing Keys



2. Key Delegation (Pooling)

Thank You!

Questions & Comments?

Roger Wattenhofer, ETH Zurich, www.disco.ethz.ch

@grauhut

BiBi BlockChain