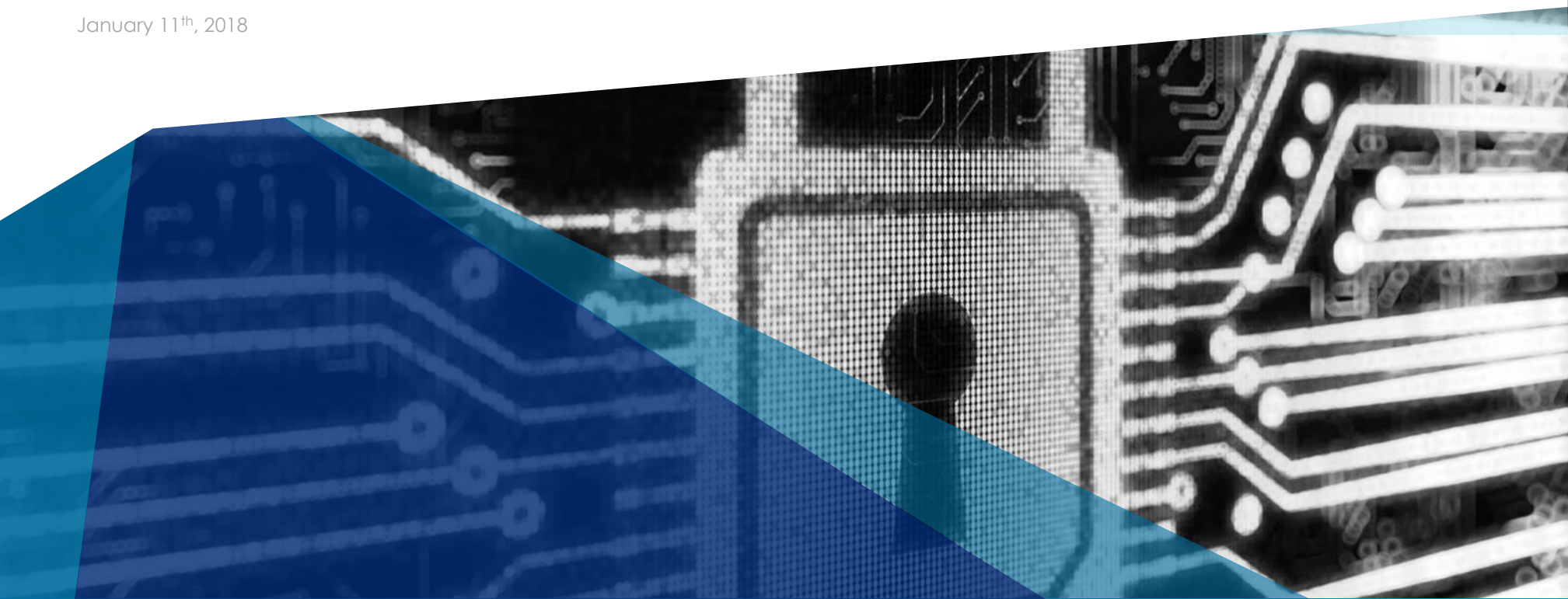


Blockchain in Insurance

CHRIS VAN KOOTEN | FCAS, FCIA

January 11th, 2018



Blockchain in the News



AXA Uses the Public Ethereum Blockchain for Flight Delay Insurance

Samburaj Das on 22/09/2017

After Months of Development, B3i's Blockchain Prototype Is Ready for Testing

ForbesBrandVoice® [What is this?](#)

SEP 25, 2017 @ 12:56 PM 3,770

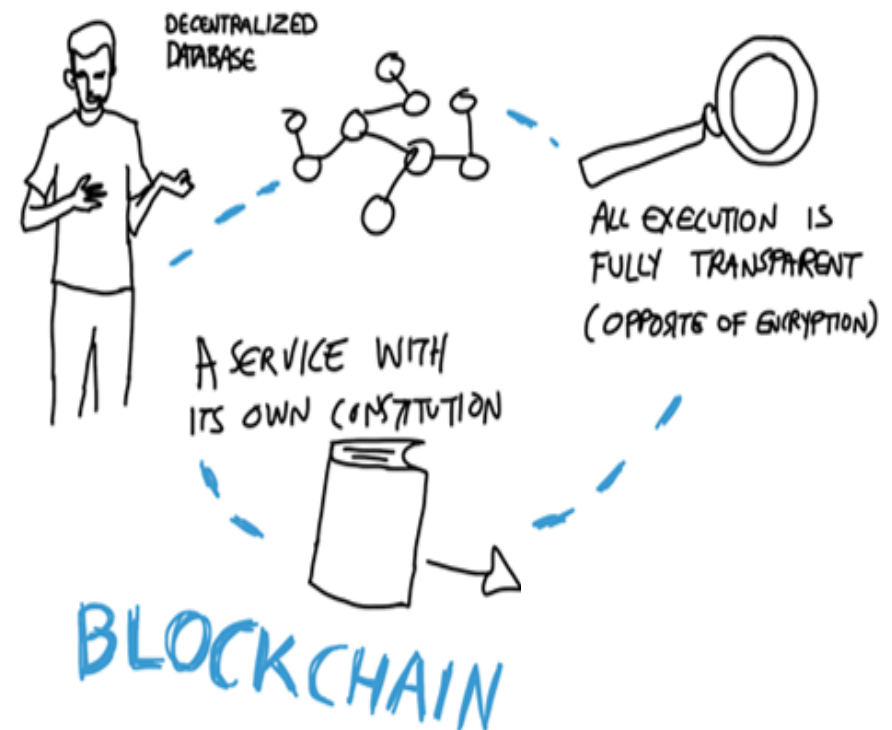
We Are Underestimating Blockchain's Value, Despite The Hype



What is Blockchain?

What is Blockchain?

Blockchain is a technology that allows individuals to **directly transact** ownership of assets, without an intermediary, through a **distributed public ledger**. The distributed system uses **cryptography** to store and validate transactions, creating a **transparent and incorruptible** platform for exchange and tracking of assets or information.



Strengths & Weaknesses

Strengths

- ✓ Transparent
- ✓ Immutable/Trusted
- ✓ Distributed
- ✓ Fast
- ✓ Single source of truth

Weaknesses

- Energy costs
- Data storage
- Scalability

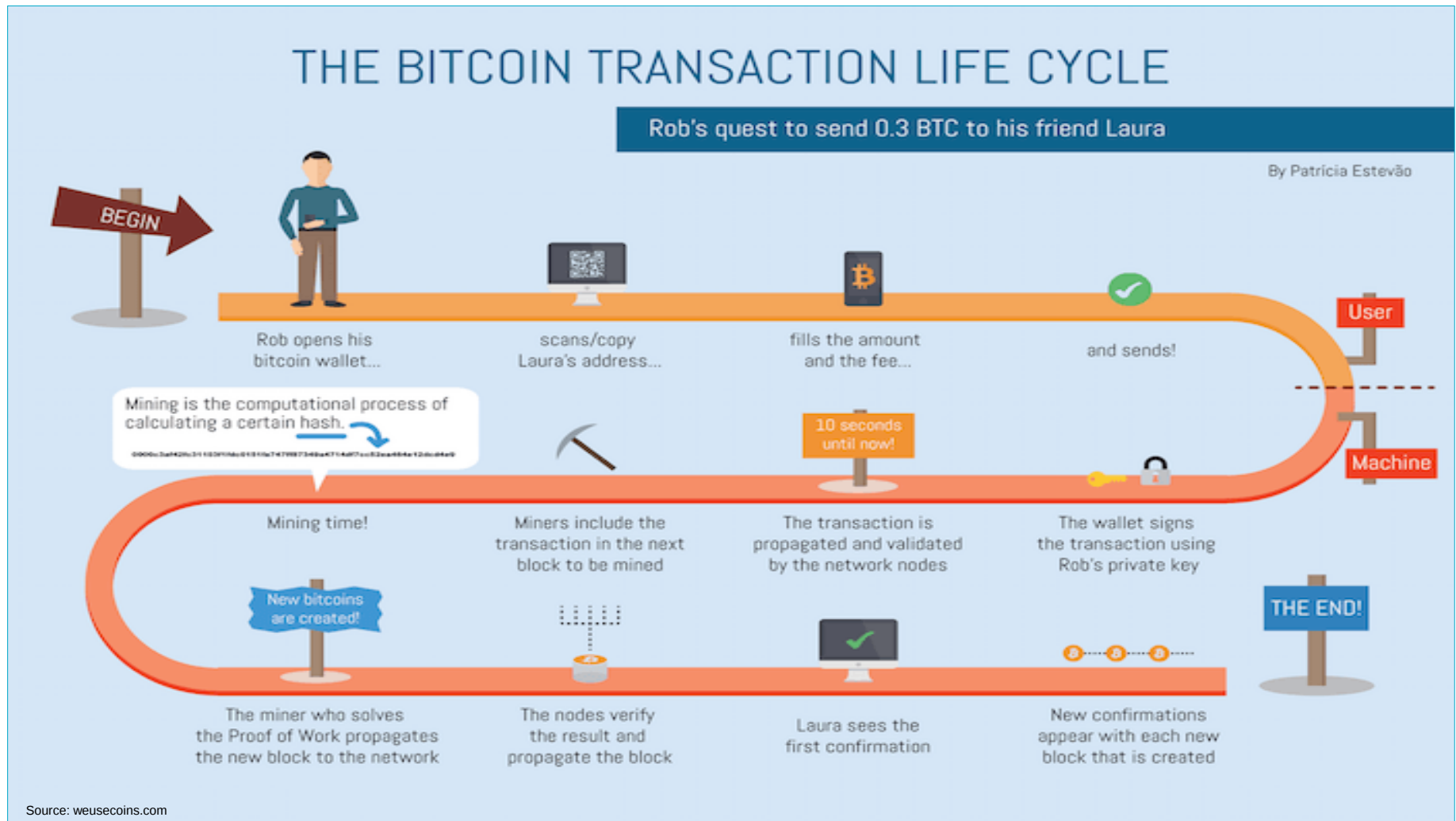


What is Bitcoin?

The Birth of Blockchain

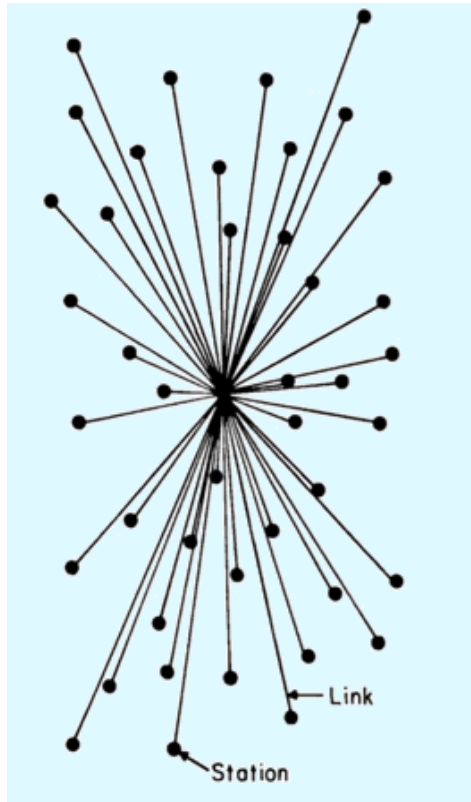
People need **banking**, but they don't necessarily need **banks**.

Bitcoin as a Use Case

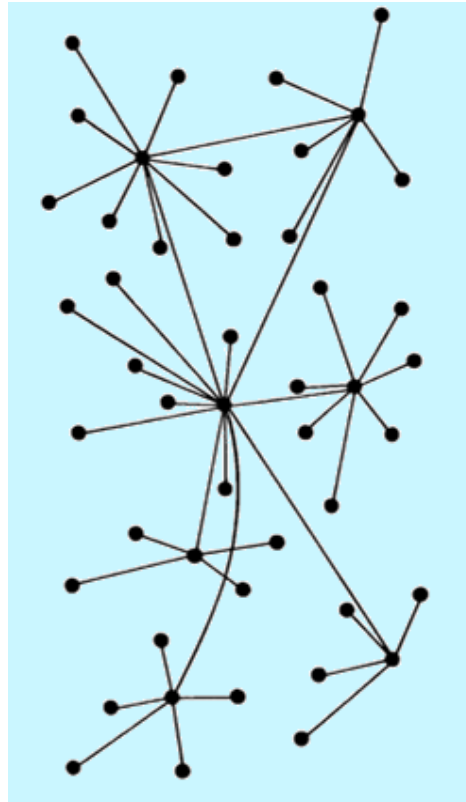


Distributed Systems

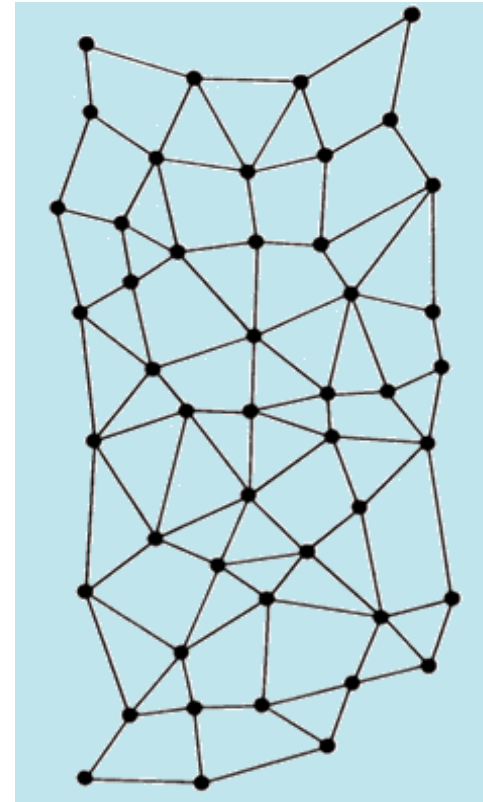
Centralized



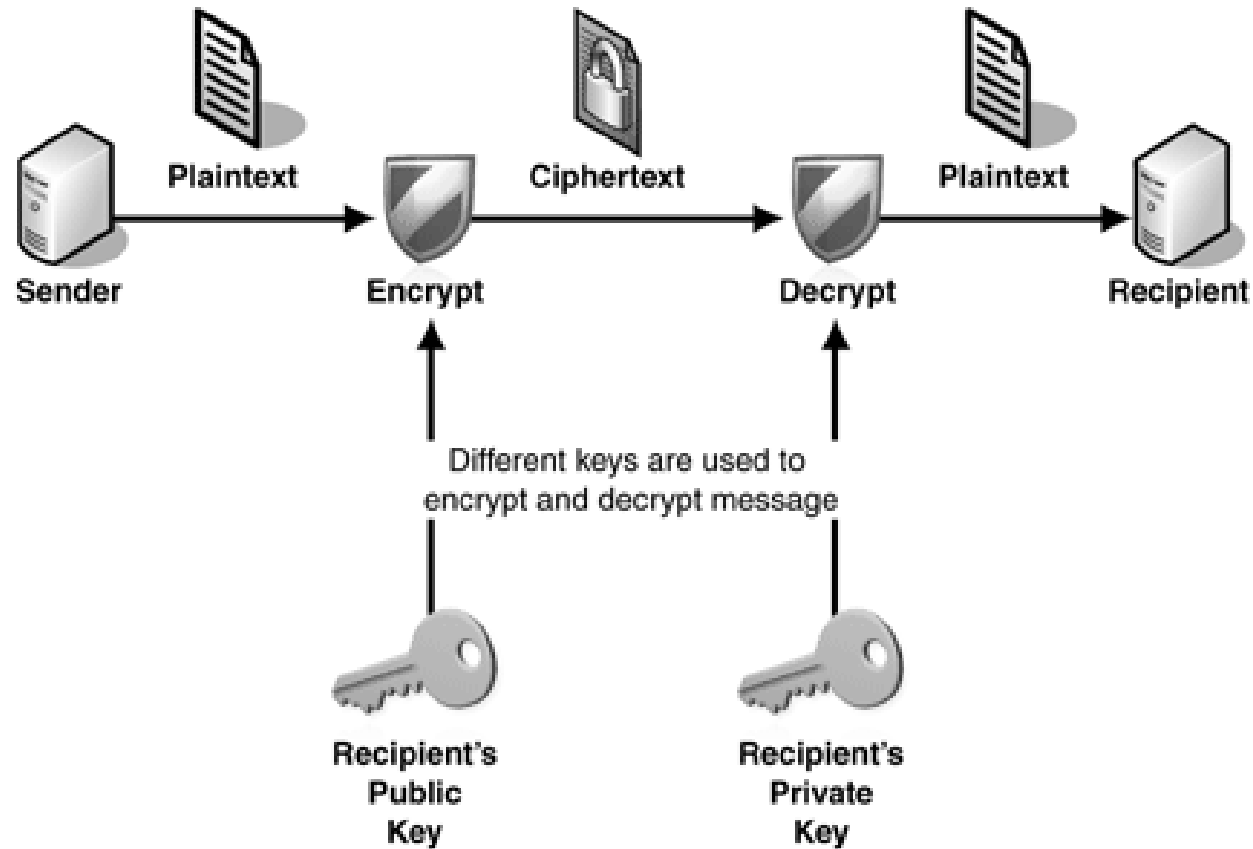
Decentralized



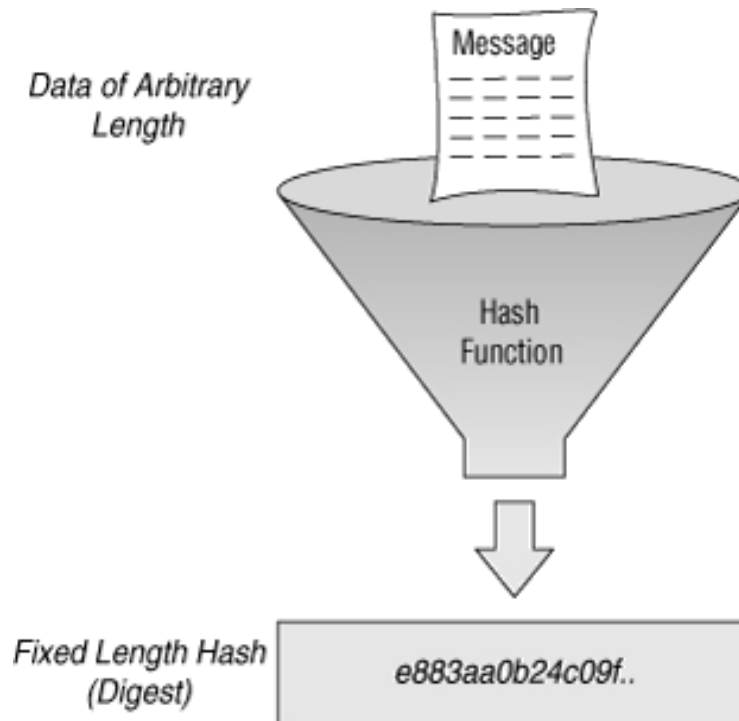
Distributed



Public Key Cryptography



Hash Cryptography



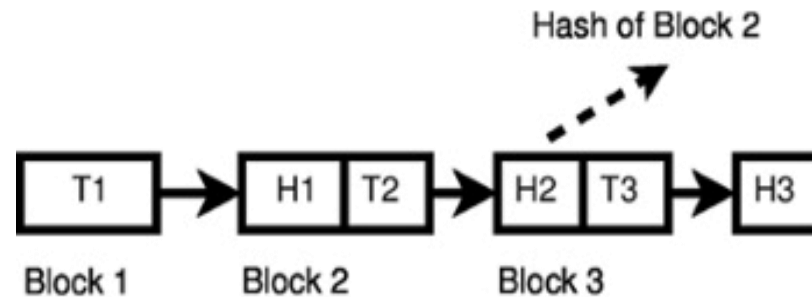
Hashing the Chain

Creating addresses:

$\text{Hash}(\text{public key}) = \text{Bitcoin address}$

$\text{Hash}^2(\text{public key}) = \text{Second Bitcoin address}$

Forming the Chain:



Hashing the Chain



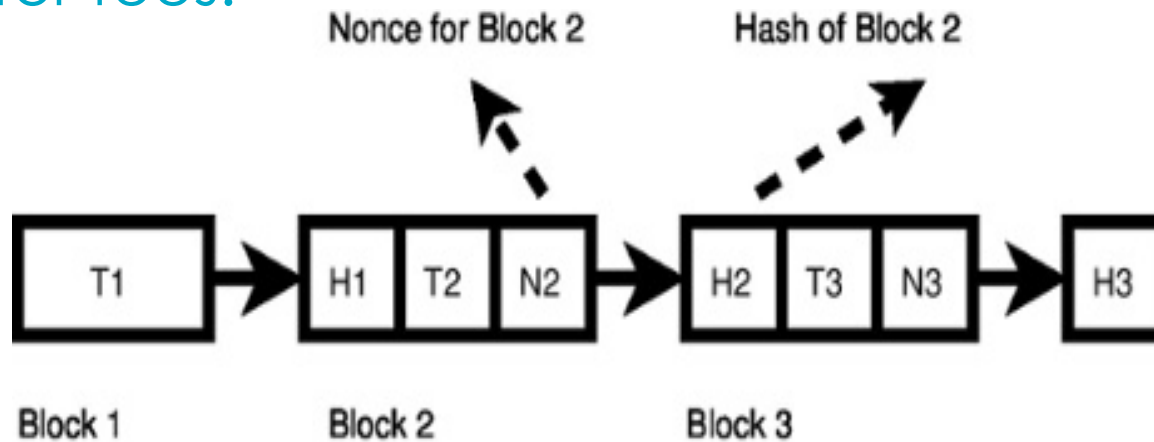
Bitcoin Mining

Problems Remaining:

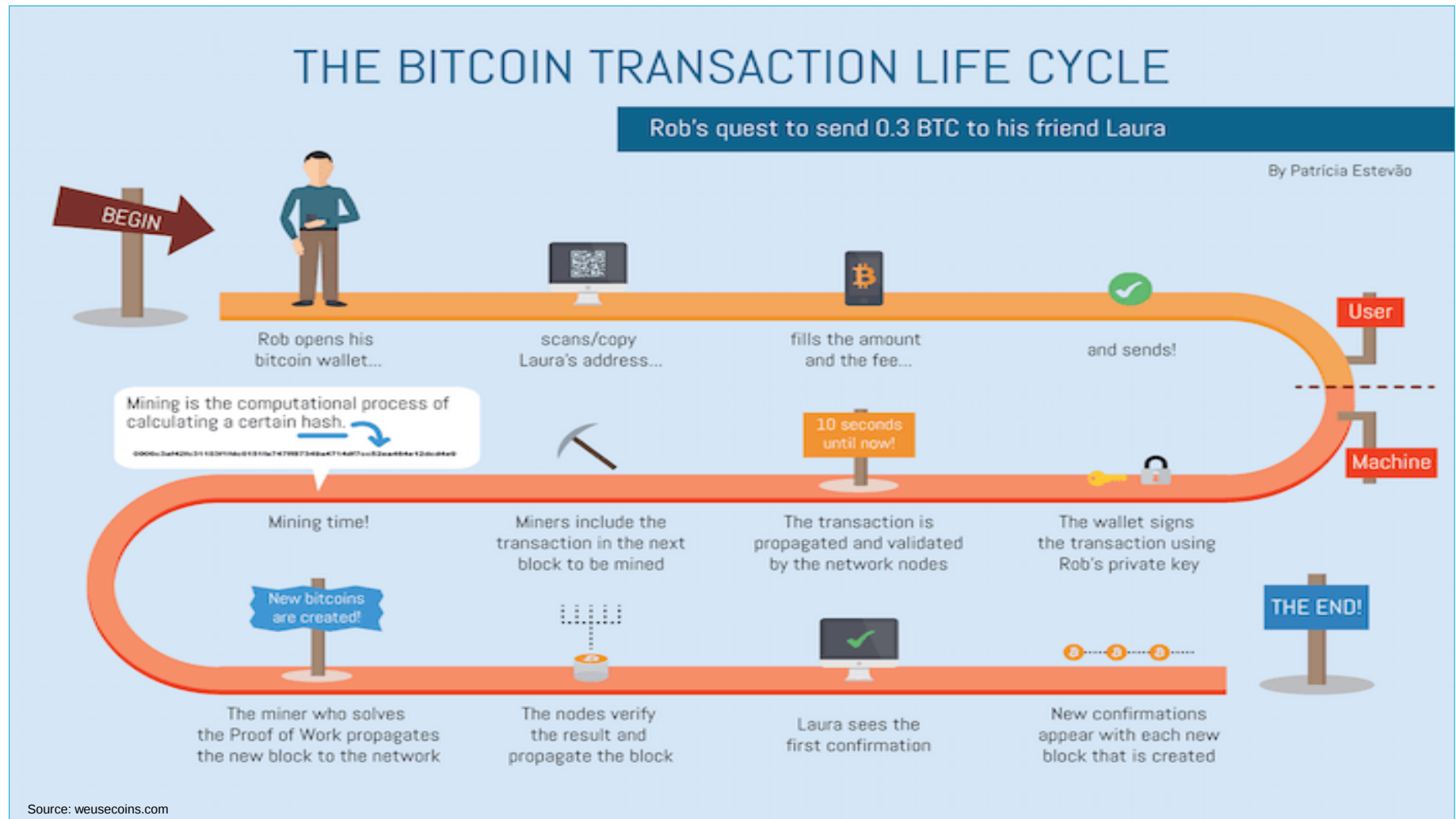
Forking of the chain

Length of the chain and resulting data storage

Mining for fees:



Bringing it all Together



Strengths & Weaknesses

Strengths

- ✓ Transparent
- ✓ Immutable/Trusted
- ✓ Distributed
- ✓ Fast
- ✓ Single source of truth

Weaknesses

- Energy costs
- Data storage
- Scalability



Where is this headed?

Private Versus Public Blockchains

Public Chains

- Open to anyone in the world (e.g., Bitcoin)
- Secured via crypto-economics, such as proof of work

Private Chains

- Permissions granted to only one organization
- Can be visible to the public or kept fully private

Consortiums

- Hybrid model controlled by a pre-selected group of nodes
- Can be visible to the public or only by members



Platforms

Bitcoin

Ethereum

Ripple

Blockstream

R3

Hyperledger

Ardor



HYPERLEDGER PROJECT



Smart Contracts

Smart contracts are computer protocols that facilitate, verify, or enforce the negotiation or performance of a contract, or that obviate the need for a contractual clause.

1



An option contract between parties is written as code into the blockchain. The individuals involved are anonymous, but the contract is the public ledger.

2



A triggering event like an expiration date and strike price is hit and the contract executes itself according to the coded terms.

3



Regulators can use the blockchain to understand the activity in the market while maintaining the privacy of individual actors' positions.



What are current applications of Blockchain?

Non-Insurance Use Cases

- Estonia government services
 - More than 1,000 government entities connected via distributed system
 - Population has full visibility into their data
- Singapore interbank clearing system
 - Digital fiat currency
- Ghana land registry
 - Blockchain used to aid land registration
 - Will ultimately enable collateralized borrowing and microfinancing

Insurance Use Cases

- B3i
 - Consortium of reinsurers launching MVP to transact reinsurance contracts
- Allianz and Nephila
 - Catastrophe swap transactions tested
- InsurETH/Etherisc
 - Smart contracts to automate insurance claims for flight cancellations or delays
- Dynamis
 - Supplementary employment insurance validated through LinkedIn connections
- Tradle
 - Blockchain enabled KYC application
- Safeshare
 - Partnership with sharing economy to offer on-demand insurance solutions (Lloyd's)



What are the challenges of Blockchain?

Challenges

- Technology not fully ready
- Energy consumed by hashing
- Government onboarding
- Powerful incumbents
- Incentives for collaboration
- Blockchain is a job killer
- Governance protocols
- Big brother
- Criminal use

