Blockchain and Land: Challenges and Opportunities

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Aanchal Anand, Land Administration Specialist, World Bank
(aanand1@worldbank.org)

Disclaimer

This presentation neither promotes nor detracts from the Blockchain technology and should not be seen as an endorsement of any of the cases, applications, or companies presented here.

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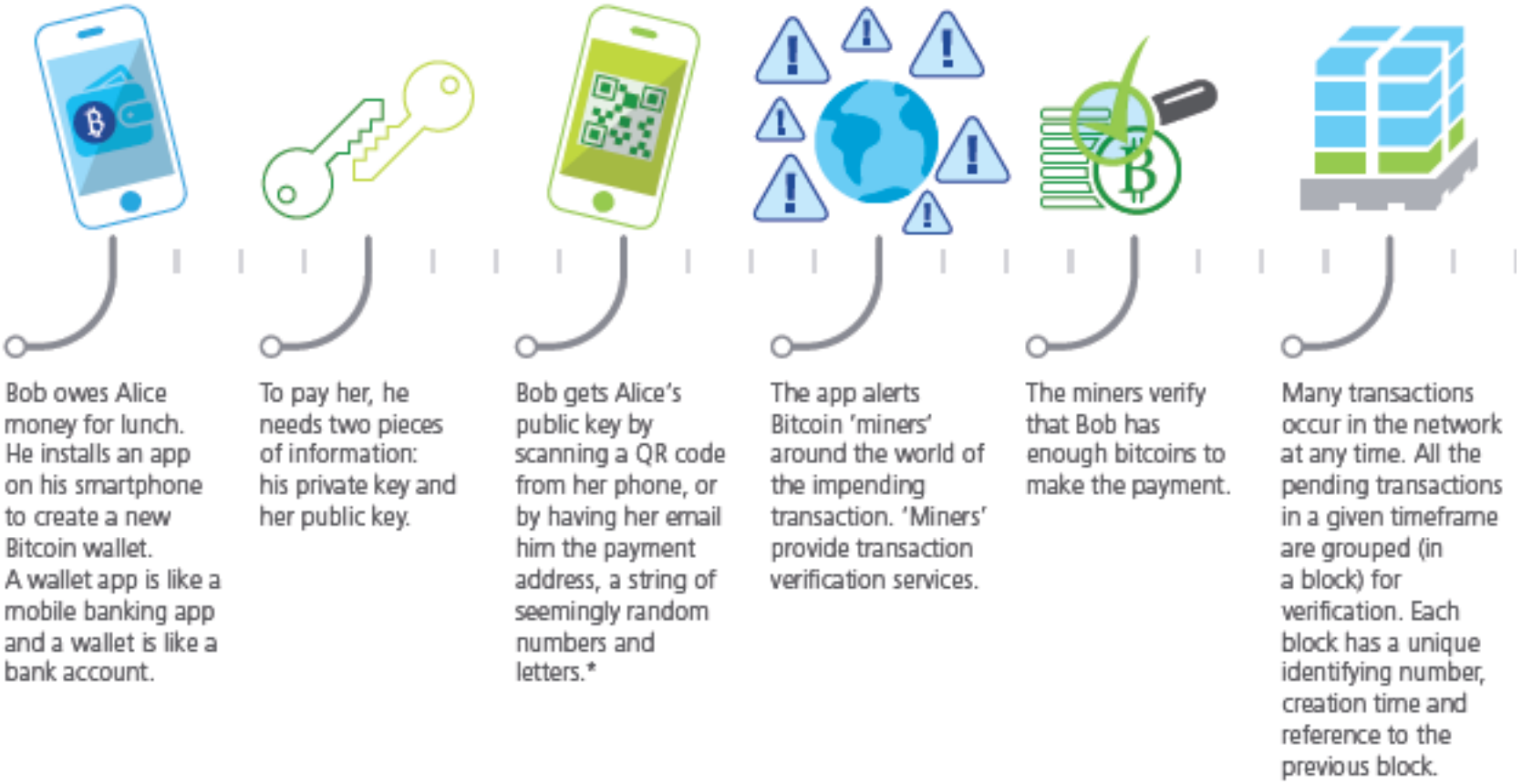
Outline

- What is Blockchain?
- How Does it Work?
- Advantages?
- Blockchain Use Cases
- Land Applications
- Blockchain: Linking Farmer-Land-Produce
- State of Play: Land Administration
- Challenges

What is Blockchain?

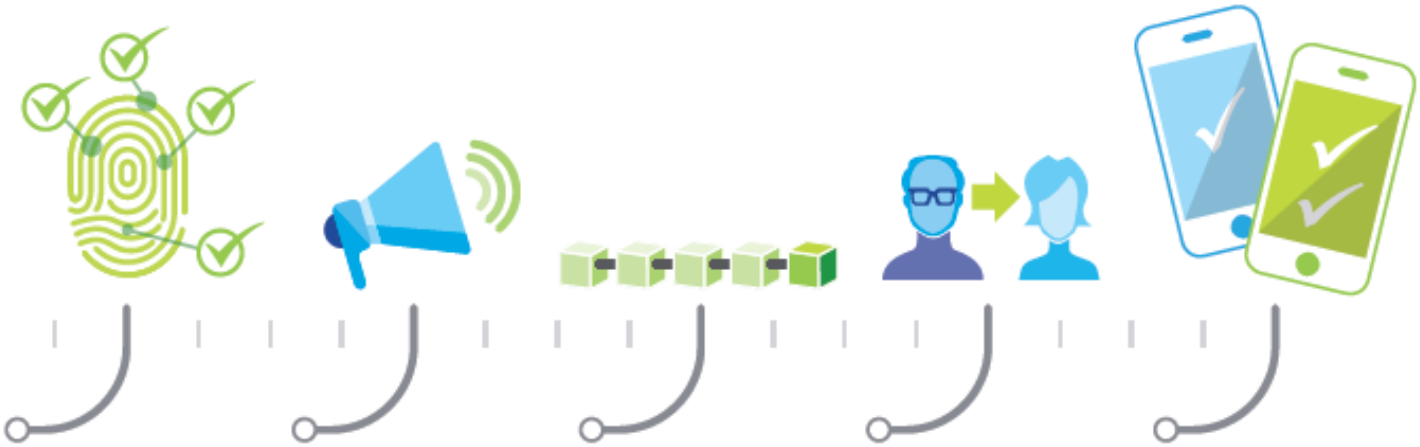
- Economic or value transfer layer or protocol for internet (TCP/IP to HTTP)
- Highly tamper resistant public database where all transactions are stored and verified by network of independent contributors computing power.
- Each block of transactions linked to previous using digitally encrypted fingerprints called hashes.
- One history of transactions back to the genesis block of the system.
- World Wide Ledger or Internet of Money/Property/Value
- Think of it as BitTorrent (P2P file sharing)

How Does the Blockchain Work? (1/2)



Source: Deloitte and American Banker

How Does the Blockchain Work? (2/2)



The new block is put in the network so that miners can verify if its transactions are legitimate. Verification is accomplished by completing complex cryptographic computations.

When a miner solves the cryptographic problem, the discovery is announced to the rest of the network.

The algorithm rewards the winning miner with 25 bitcoins, and the new block is added to the front of the blockchain. Each block joins the prior block so a chain is made – the blockchain.

Within ten minutes of Bob initiating the transaction, he and Alice each receive the first confirmation that the bitcoin was signed over to her.

All the transactions in the block are now fulfilled and Alice gets paid.

Source: Deloitte and American Banker

What Are Some of the Advantages of Blockchain?

- Decentralized
  - P2P system
  - Lower transaction costs and reduced rent-seeking behavior
- Distributed
  - Highly secure
  - An attack on one is *not* an attack on all
- Time-stamped
  - Know what happened when
- Tamper-proof
  - "The Trust Machine" – *The Economist, October 2015*
- Public vs. Private
  - Public: fully decentralized
  - Private: lower costs and faster speeds

Blockchain Use Cases

Financial

- Cryptocurrencies
  - Bitcoin, Ethereum, LiteCoin, Zcash
- Payments and Remittances
- Clearing and settlement
- Smart Contracts
- Smart Assets
- Escrow
- Know Your Customer

Non-Financial

- Digital Identity
- Certification of ownership and quality
- Tracking
- Voting
- Management of records
- Resource management
- E-Residency
- Land and Real Estate

…and many more

Blockchain Land Applications

- Timestamped Hashing

```
hello world  ==>  98c615784ccb5fe5936fbc0cbe9dfdb408d92f0f

Hello World  ==> a830d7beb04eb7549ce990fb7dc962e499a27230

Hello World! ==> 8476ee4631b9b30ac2754b0ee0c47e161d3f724c
```

- Virtual Notary
  - Certification of documents by hashing and providing timestamped proof of integrity
- Multisignature Transaction/Ownership
  - Multiple owners (financial institutions, contractors, etc) can be represented
  - Added layer of security for property rights of women, minorities, and vulnerable groups
- Smart Contracts
  - Execution based on conditional instructions without third party intervention
- LandCoin?
  - Promoting sustainable land use and management

Blockchain: Linking Farmer-Land-Produce

BanQu and Smallholder Agricultural Supply Chains

- **BanQu offers traceability for Farmer, Land, and Asset.**
- Most other systems can offer traceability for one or two of those elements, but BanQu offers all three.
- Farmer and asset achieve **traceability, transparency and visibility** throughout the supply chain from farm level to end of life.

Farmer

Farmer gives permission to be part of system and is enrolled using biometric data.

Land

Enrolled farmers land is mapped into system using GPS coordinates.

Asset

Produced “assets” such as cocoa/coffee are linked to farmer and land.

Source: BanQu

State of Play: Blockchain and Land

Government-Led

- Sweden: ChromaWay
- The Netherlands

Private Sector

- BitFury/Georgia
- Factom+Epigraph/Hondruas
- BenBen/Ghana
- Other possible developments:
  - Ukraine?
  - Armenia?
  - Afghanistan?

Challenges

- Relatively new and untested technology
- “Garbage in, garbage out”
- Legal recognition
- Lack of standards
- Limited processing of large volume of transactions
- Need to build infrastructure to support growing demands
- Cybersecurity of private blockchains, specific exchanges, private repositiories
- High electricity use
- Other risks will become apparent as the technology becomes more widespread

Thank you!

Kiitos!