ITU – NBTC Training
On

“Building Distributed Ledger Technologies (Blockchain) Projects”

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Session 3:

“Developing DLT Projects”

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Contents

1. Why use DLTs?
    - Disruptive Elements
    - Transformative Opportunities
2. DLT Business Models
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Why use DLTs?

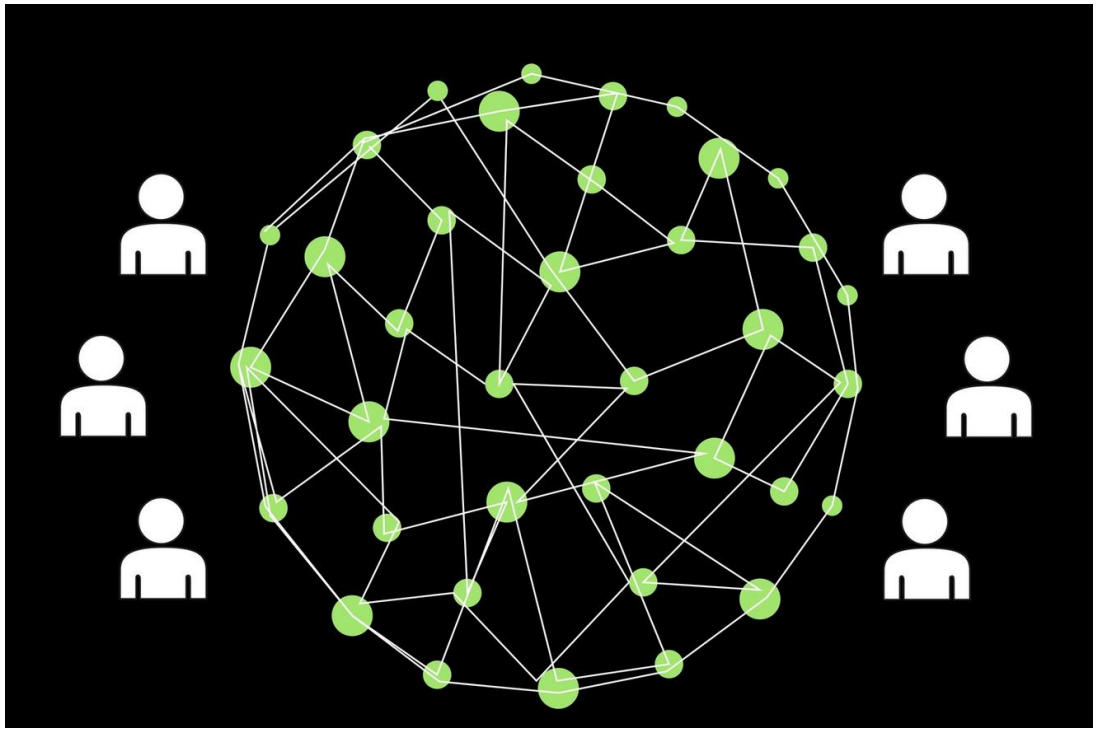
Gartner forecasts that the business value that is driven by DLTs will amount to $3.1 trillion by 2030.[1]

Disruptive elements

- Transparency
- Immutability
- Security
- Consensus
- Smart Contracts
- Tokenisation

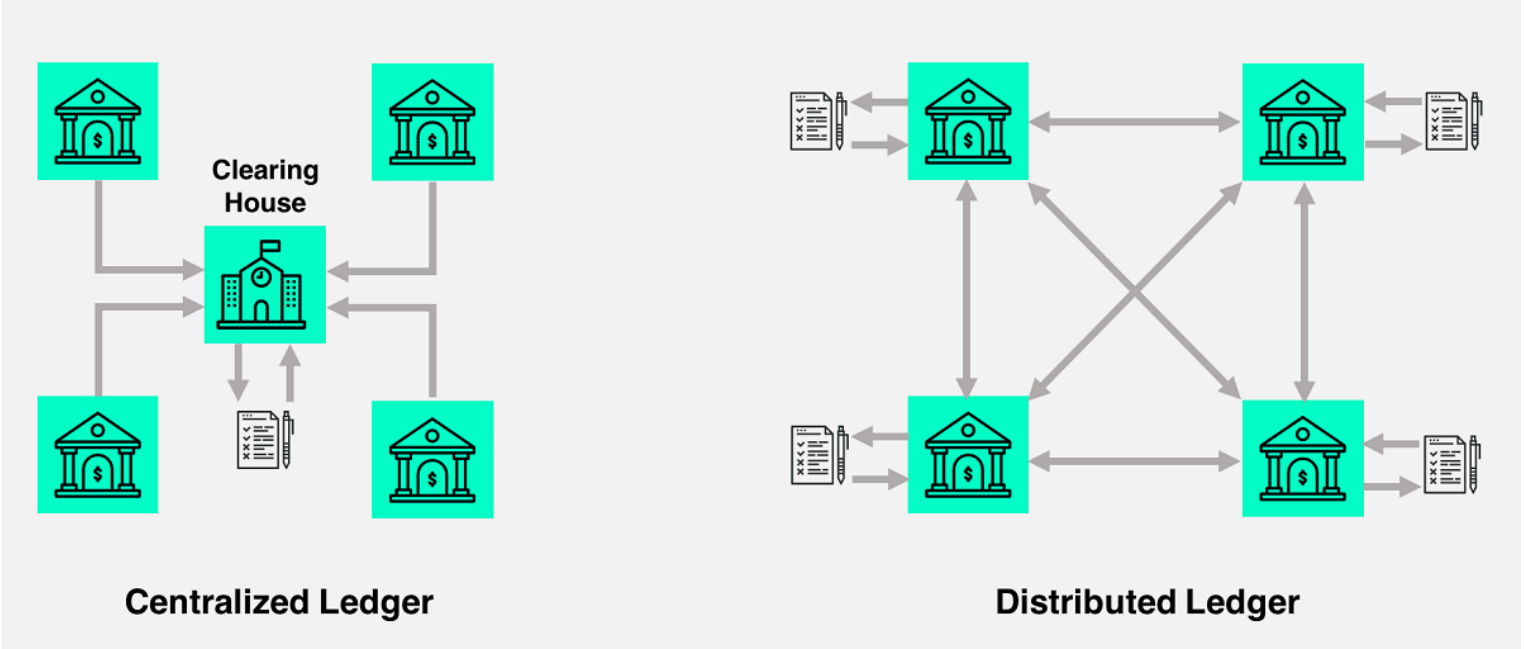
Opportunities

- Transformative power of DLTs
- Transformation opportunities



Transparency

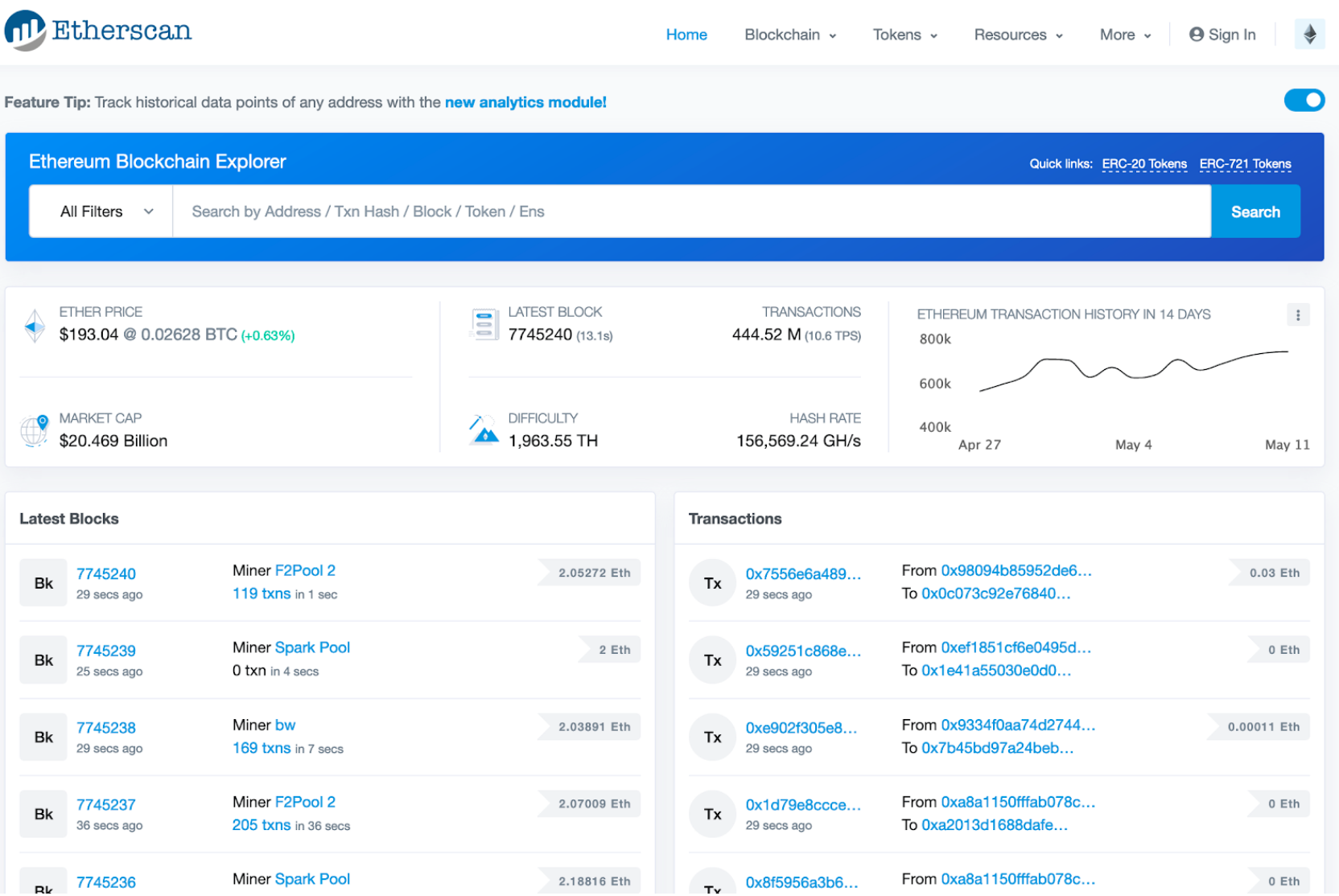
- End-to-end visibility of your business transactions
- Single source of truth that is replicated or shared across the distributed ledger in your network
- Can be permissioned or public
- See the full trail of a transaction
- Highly resistant to fraud and bad actors



Case Study

- Supply chains

Link: Etherscan



Immutability

"Object whose state cannot be modified after it is created"

- Once you create a record on a blockchain for a particular timestamp, it cannot be changed.
- When making a change to an existing record, it will create a history of that event occurring so that you can trace all data changes. This is visible to all participants on the network
- Each transaction is encoded into a data block which is uniquely signed and timestamped.
- Each block of data is connected to those before and after it
- These blocks link together to form a chain which is immutable and irreversible
- An immutable history of transactions eliminates challenges of counterfeiting and fraud faced in many industries

Case Study

- Counterfeiting in the film and music industry

Security

- DLTs have been designed with security as a priority
- Every transaction record on a DLT is cryptographically secured with digital signatures and a trail of the transaction updates
- Participants on the network have their own private keys that are assigned to a transaction
- Because DLTs are distributed across the whole ledger, a hacker would have to change every single copy of the ledger to make a change
- Each transaction is validated or consented to by network participants before it is posted to the ledger

Case Study

- DAO hack

Consensus

Consensus drives fair participation in a business network with democracy

- The network participants on a DLT use a consensus mechanism to validate business transactions
- A consensus mechanism is a protocol that makes sure all nodes on the network are synchronized with each other and agree on which transactions are legitimate and are added to the blockchain/DLT
- This eliminates the need of central trusted authorities
- There are 3 main protocols:
  - Proof of Work
  - Proof of Stake
  - Delegated Proof of Stake

Proof of Work

- Uses a process known as mining
- Nodes in the network are miners
- Miners solve complex mathematical puzzles which require large amounts of computational power
- The first one to solve the puzzle gets to create a block and receives a reward for creating that block

Proof of Stake

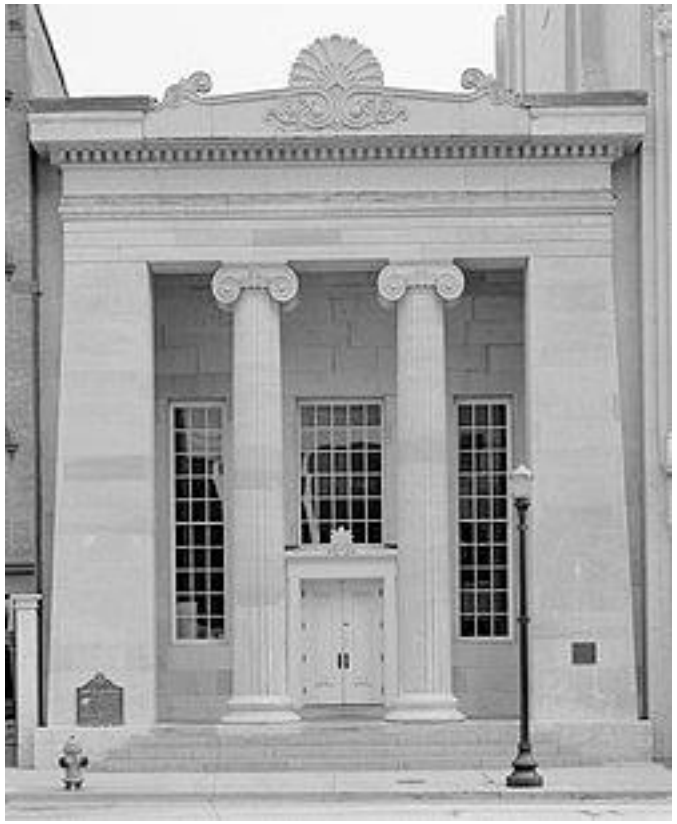
- Makes use of the premise that those who own most coins in a network have a vested interest in keeping the network maintained and the value of its coins high
- A randomized process is used to determine who gets to produce the next block
- Users can stake their coins to become a validator, which means they lock up their tokens for some amount of time
- In general, the bigger stake you have, the more likely you will get to produce the next block
- Validators are rewarded for producing new blocks

Delegated Proof of Stake

- Users can stake their coins to vote for a certain amount of delegates
- The weight of their vote depends on their stake
- A delegate is a person or organization that wants to produce blocks on the network
- The delegates which the most votes get to produce the blocks and are rewarded for doing so

What is the effect of these factors?

Trust



ASIC

Australian Securities & Investments Commission

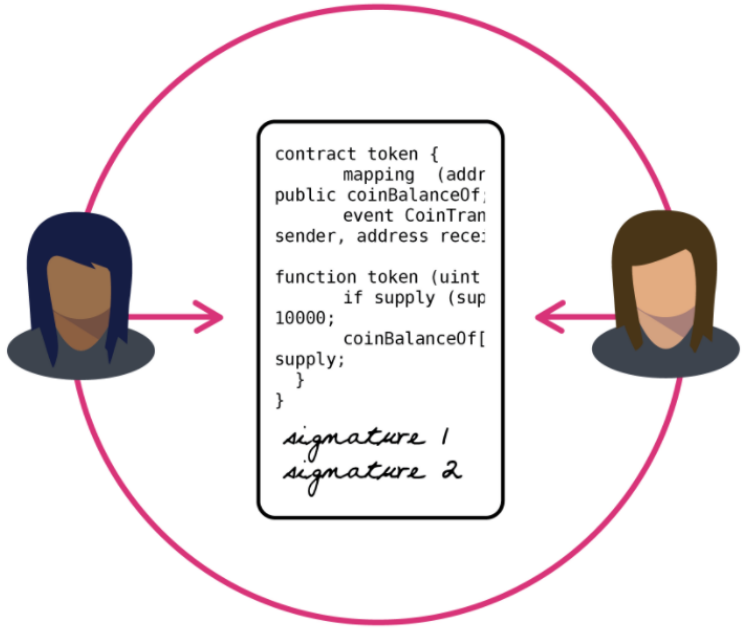
?

Smart Contracts

- Smart Contracts are not legal contracts
- They are self-executing electronic rules built on top of a DLT
- Any transaction in a DLT is subject to the related Smart Contracts
- SCs connect tokens or data to business logic in an automated way
- Written in code

Case Study

- Gambling
- Water usage
- Energy production from your solar panel



Banking & Finance

- Digital currency
- Financial services for the unbanked
- Cross-border transfers – remittances
- Remove bureaucratic overhead
- Automated financial flows

Transformative Opportunities

Banking & Finance

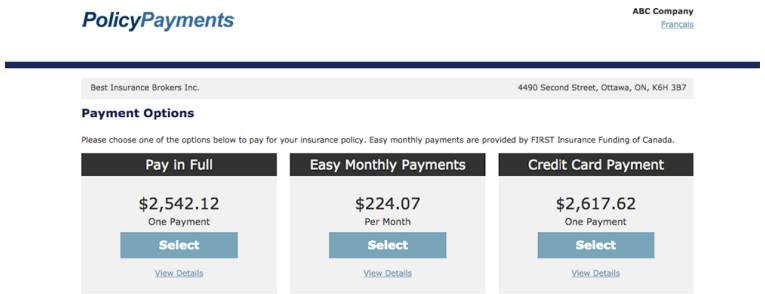
Cooperatives

Digital Identity

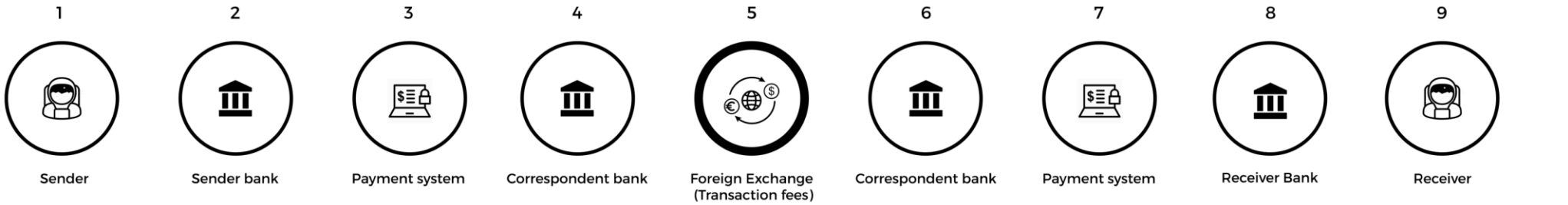
Supply Chain Management

Voting

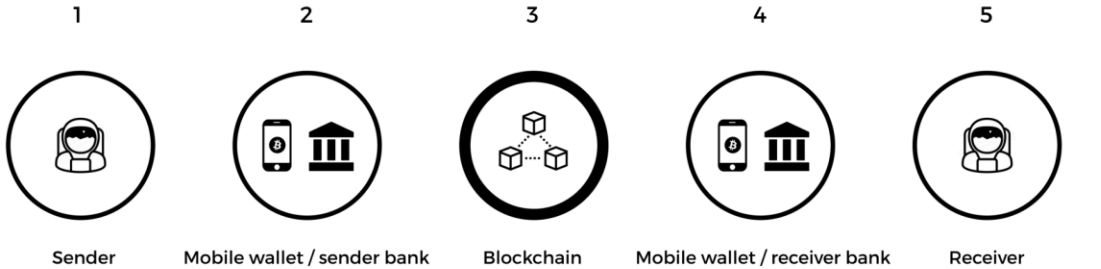
Insurance



TRADITIONAL PROCESS

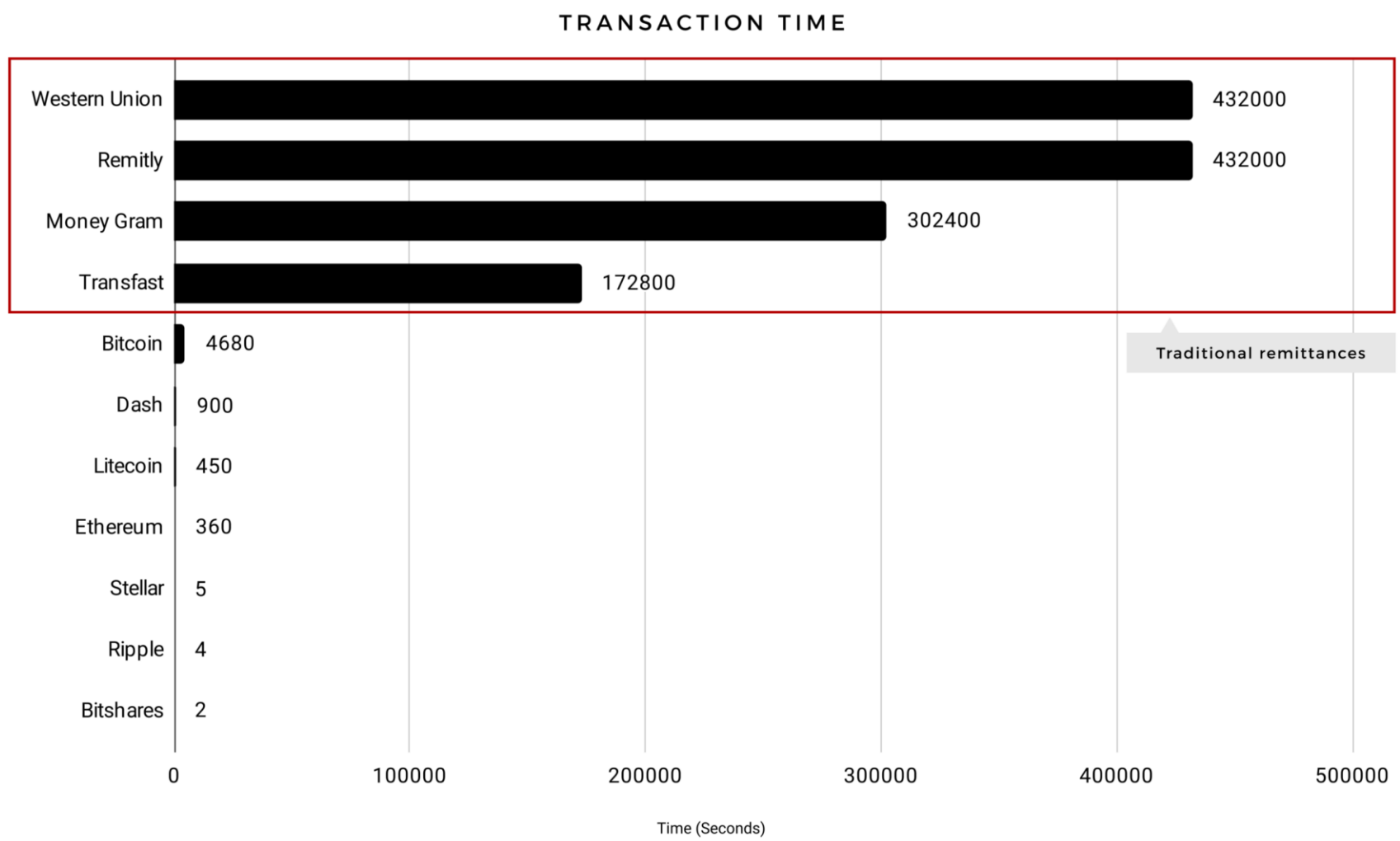


NEW PROCESS (BLOCKCHAIN)

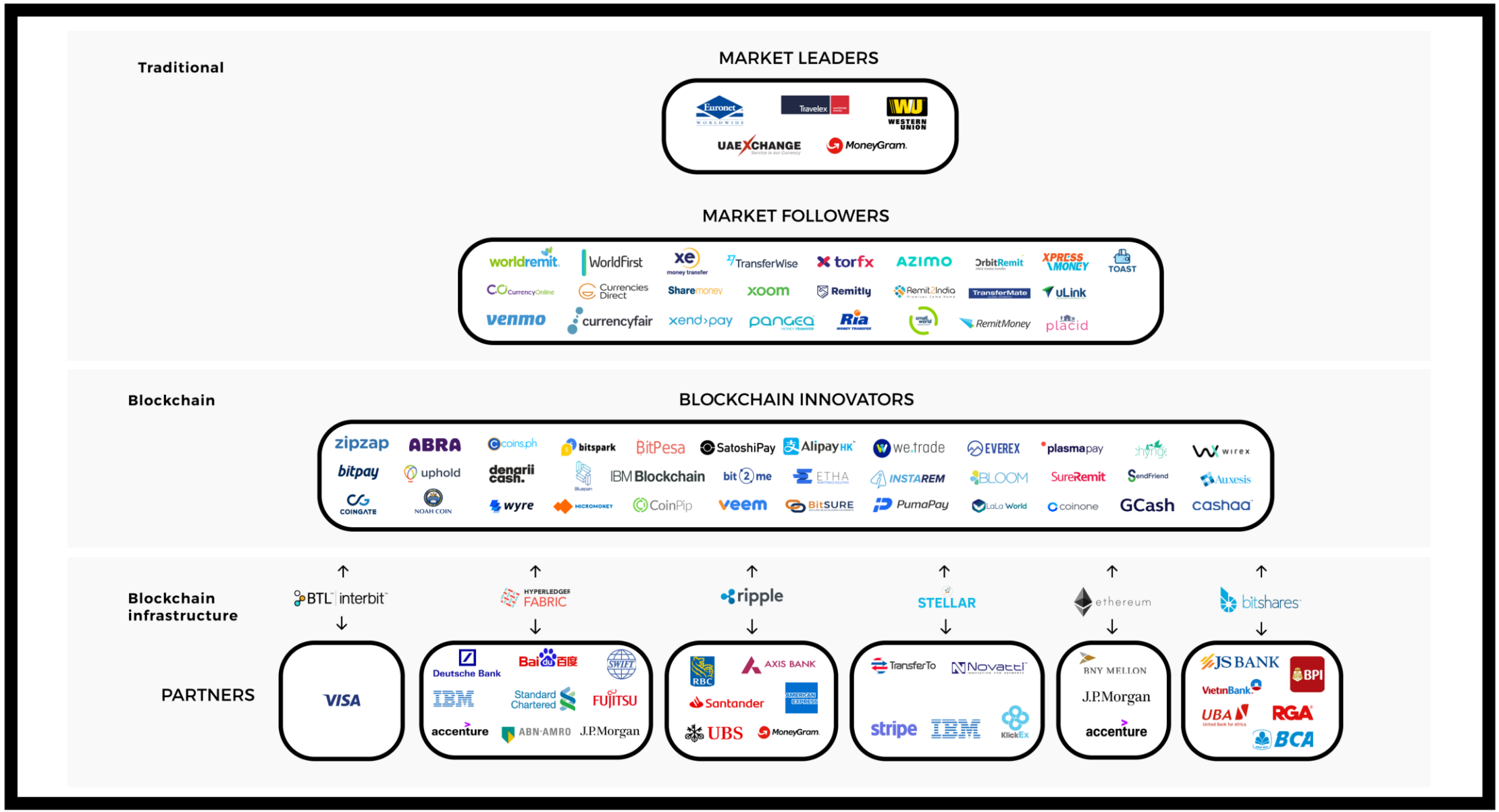


BLOCKDATA | BLOCKCHAIN VS TRADITIONAL REMITTANCE TRANSACTION TIME & FEES |

COMPANIES	TRANSACTION TIME	FEES ($)
Western Union	3-5 days	9.7
Remitly	3-5 days	2.7
MoneyGram	4-5 days	9.7
TRANSFAST	2-4 days	0.8
Bitcoin	1.3 hours	0.37
Dash	15 mins	0.02
Litecoin	7.5 mins	0.03
Ethereum	6 mins	0.09
STELLAR	5 secs	<0.01
ripple	4 secs	<0.01
bitshares	2 secs	0.04



Notes: The data is based on transactions from United States to foreign countries. Excluding cash, debit/credit card transfer.
Sources: World Bank Data; bitinfocharts



Sources: Blockdata.tech

Cooperatives

- A legal entity owned and democratically controlled by its members, who typically have a close association with the business of the cooperative
- Commonly found in agricultural sector
- DLTs and Smart Contracts allow for the business rules and distribution of revenues to be handled fairly, without the need of an intermediary
- Could create a cooperative of digital workers such as designers who get work distributed to them by a Smart Contract and on completion of the work, have their reward allocated

Digital Identity

- Currently, individuals have no control over their data and it is in the hands of corporations all over the world
- Because identity data is based on centralized servers, the owners of the servers have ultimate control. This leads to mishandling of personal data and identity theft
  - Example: Cambridge Analytica
  - Example: haveibeenpwned.com
- DLTs can improve identity in 3 main ways:
  1. Digital units shouldn't be easy to replicate
  2. Digital files should be tamper proof
  3. Digital processes should be tamper proof
  4. The individual has ultimate control of their own data

Supply Chain Management

- A supply chain involved many participants to get a good from creation to consumer.
- It is difficult to get realtime visability of shipments in a supply chain because normally each participant (user of goods, retailers, distributors, manufacturers, suppliers, brokers etc) have their own data store.
- A DLT driven supply chain network allows transparency among actors in a network, without data stores in silos.
- Each piece of information on a DLT has an ID and timestamp which can be traced
- Automation through the supply chain through IoT can improve accruracy and reduce error in data entry
- Enables end users to know providence of the products they purchase
- Reduces settlement times

agridigital

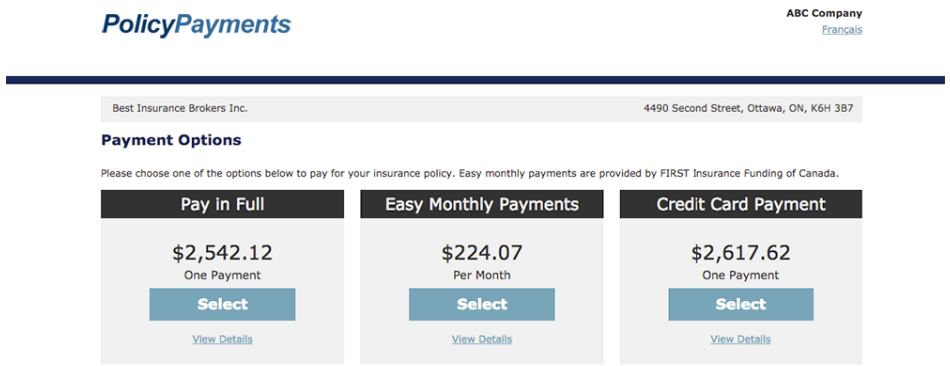
https://www.agridigital.io/

Voting

- At a national, regional or local level possible
- Could be used within your organization
- Removes need for independent parties to oversee voting procedures
- Trust built into the voting system
- Each vote is immutable on a DLT with a timestamp

Insurance

- Currently insurance services need to be centralized with an organization
- This is because we cannot trust an individual to do it for us
- However this results in high fees and restrictive contracts as these companies become very powerful
- Insurance could be handled through Smart Contracts without the need for a centralized organization
- The Smart Contract could also automatically resolve claims without the need for long, manual processes



DLT Business Models

1. **Founder-led network**
   Single organization leading the project, others join the network at a later stage
2. **Joint venture network**
   Two or more organizations create a joint venture to govern the network
3. **Consortium network**
   A consortium as the initial network and governance in a specific industry or sector
4. **Business ecosystem**
   A consortium network working across many industries or sectors

Founder-led network

Also known as the build-own-operate model, it is usually adopted by a public-private partnership in which the private entity builds, owns, and operates a structure or facility. Public entities may provide assistance in the form of tax incentives, licensing and governance, and other types of support.

Advantages	Disadvantages
Founding entity establishes industry leadership	May require large initial capital investment
Can set up residual value in the network, including revenue streams and adjacent business models	Can be difficult to win over other stakeholders if they don't have a stake in the network
Founding entity can make decisions quickly, without the need of agreement from other stakeholders	

Joint venture network

A joint venture (JV) is an entity created between two or more parties to operate a business activity together. In this structure, the parties create a legal business entity that represents them. They will contribute to this entity through investment, capital or other contributions. After creation, they will then typically share the revenues, operating expenses, and operational control of the enterprise.

Advantages	Disadvantages
Can be set up quickly	Inequalities may occur in skills, investment and other factors which could cause operational inbalance and difficult decision making.
Reduced risk and initial capital contribution	As resources merge to create the JV, they can be difficult to split equitably at the end of the venture
Ability to share expertise and resources between organisations	

Consortium network

A consortium is normally an industry-specific association of two or more organisations. These organisations share objectives in an industry-specific business or common activity to achieve a common goal.

In this structure, each participant retains its individual legal status. Collectively, the members may create a consortium governing body to manage the activities, bylaws and engagements of the consortium.

Advantages	Disadvantages
Flexible contractual rules can change as the industry evolves	Issues of liability
Business advantages of taxation, regulatory adherence	Issues of performance
Development of a shared industry voice	

Business ecosystem

A business ecosystem combines a platform-thinking approach with a model that includes the networks of existing organisations and individuals. The participants seek to capitalize on new business opportunities by creating an environment that facilitates co-creation and offers new value propositions to customers.

This could be in the form of a marketplace that includes suppliers, distributors, customers, competitors or government entities.

Another example is of a cooperative where participants join together to provide a more complete business offering.

Advantages	Disadvantages
Flexible contractual terms	Issues of liability, accountability and performance
Business advantages of taxation, regulatory adherence	May be difficult to end or leave once it has been created
Development of an industry voice	
Economies of scale	

Monetization in DLT businesses

DLT offers the first time businesses can directly link their business logic to currency without manual process.

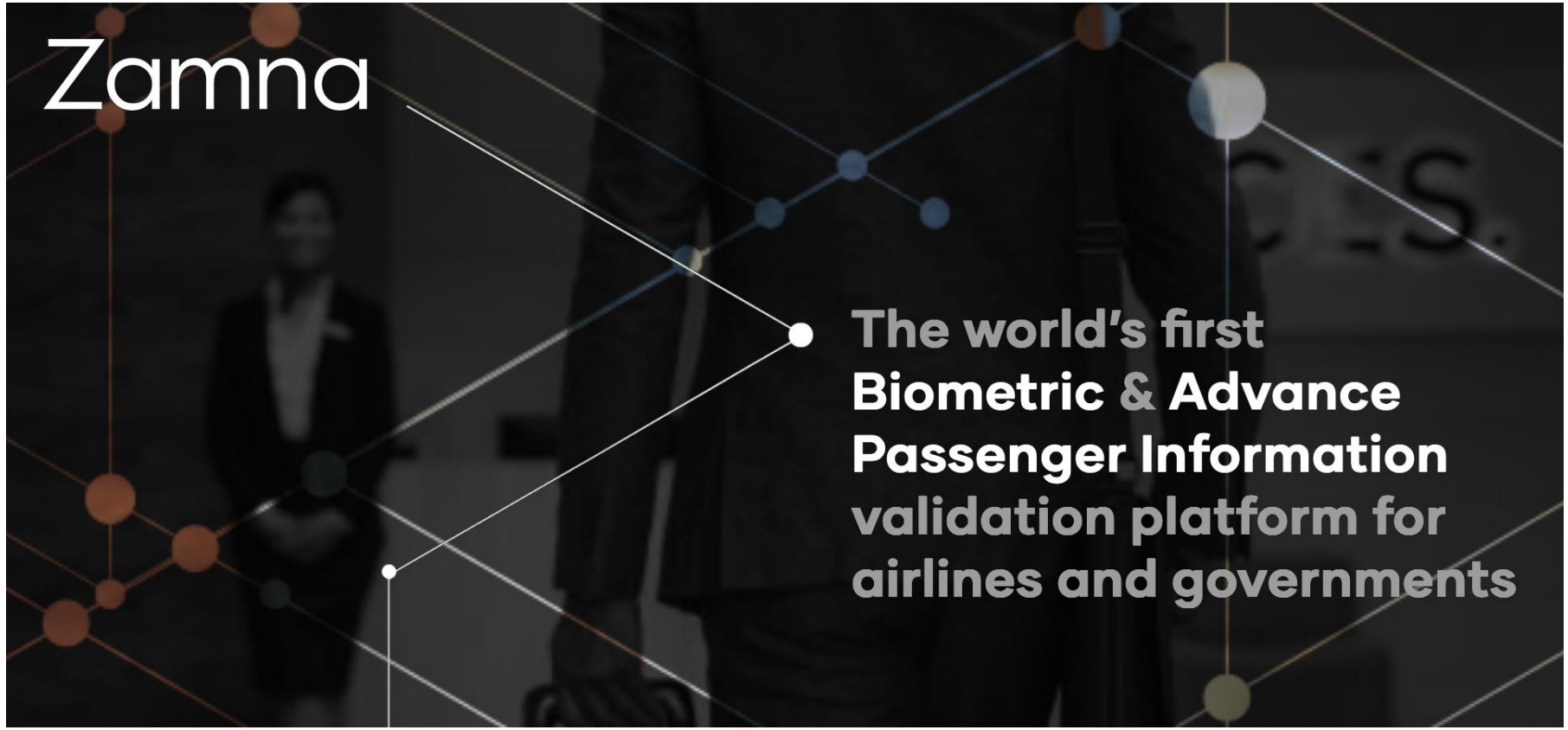
Monetization can be achieved in several ways:

- Payment for services or products
- Transaction, membership or service fees
- Capital gains from your ownership of the network token

How is this different from normal businesses?

- Automated financial flows
- Instant settlement
- Reduced fees

Example: Zamna



Thank You

1. Gartner, Forecast: Blockchain Business Value, Worldwide, 2017-2030. www.gartner.com/doc/3627117/forecast-blockchain-business-value-worldwide