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# Blockchain Implementation in Small and Medium Enterprises



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# Introduction

**The presentation concerns the problem of the implementation of blockchain technology in Small and Medium Enterprises.**

**Blockchain seems to be the one of the most recent technological innovations.**

This technology can be used in industry, the public sector, health care, education and business.

**The potential of this technology is not yet fully examined.** Initially, blockchain was mainly used for cryptocurrencies, but this is only part of the possible applications.

**Large possibilities of practical use result from the fact that making any change in historical records is impossible.**

There is no central server that could be vulnerable to cyber attacks.

**This technology allows you to execute immediate financial transactions without intermediaries.**

# Agenda of the presentation

This presentation consists of an **Introduction** after which the **definitions** of Blockchain have been presented.

**The most important part of the presentation presents the results of analysis related to Blockchain implementation in Small and medium Enterprises.**

**In addition, the presentation includes assumptions regarding further development of this technology with particular emphasis on IoT (Internet of Things).**

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# Definition of Blockchain

**Blockchain is a public and shared database of all transactions**

( transfers of any amount between bitcoin portfolios, accounting entries) **on the Internet, without central computers and in chronological order.**

**Each transaction is saved in a block chain and coded using algorithms** - without any exceptions, thanks to which the individual activity is verified on an ongoing basis by all users involved in the transfer.

**Hence, it becomes impossible to modify data, delete or add false information.** It is an open register that everyone can access.

# Features of Blockchain

## The distinguishing features of blockchain are:

- **decentralized and distributed database** (this means that there is no unit that controls the data appearing in the block chain. In addition, all data and the entire blockchain history is available for download by every network user.)
- **data (transactions) recorded in the block are immutable and irreversible.** (the transaction register that the blockchain offers can not be edited, once saved, the data remains in the block and it is not possible to change it.)
- **transactions are encrypted** by cryptographic tools. (this ensures the security of data contained in the blocks.)
- **the transaction register is public** (everyone has access to the entire transaction history).

# Features of Blockchain

**The features described above do not have to be a distinguishing feature of each block chain.**

Equally well, **access to the database stored in the blockchain, can be limited only to authorized users.**

**There is also a possibility to create a blockchain with the possibility of editing previously saved data.**

It all depends on the needs of the creator of the block chain and what will be recorded in the protocol.

# How block chain works?

The blockchain networks are built from three major components:

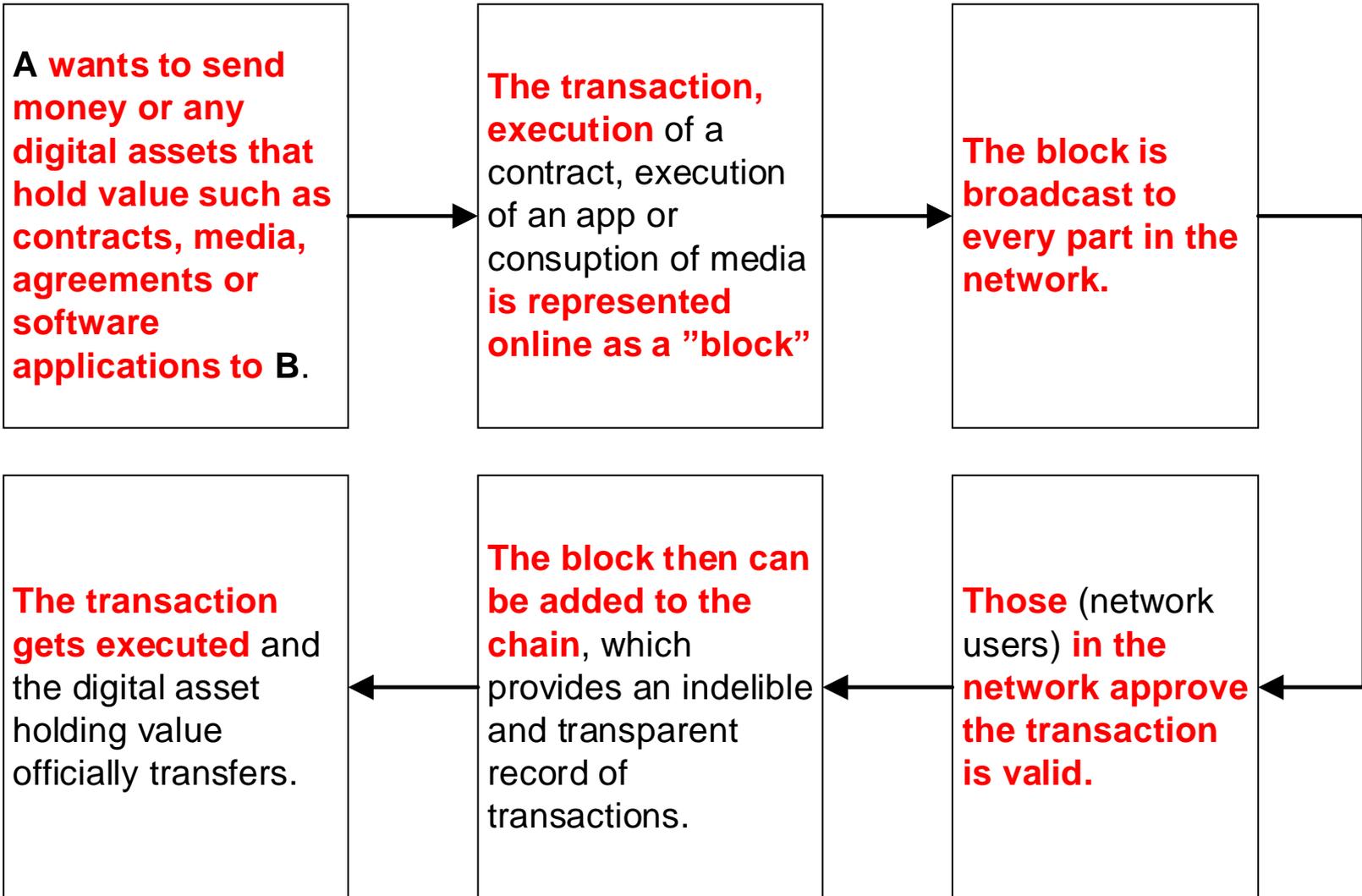
**A cryptographic keypair (public + private key, stored in a blockchain wallet)** enables a secure digital identity reference. The keypair helps ensure that Jane is exchanging data with Joanna, not John, without exposing Jane's private details. By signing your transaction with your private key you also place an "ownership stamp" on it, meaning the transaction can be traced back to you if needed.

**A decentralized, P2P network.** Instead of a central authority, a community of users decides whether your transaction is valid and can be added to the blockchain. The community uses mathematical verification to evaluate the history of the individual blocks that are proposed to be added and the "sender" signature validity. Once enough users verify that your transaction is valid, it is processed and recorded on the blockchain.

# How block chain works?

**The network servicing protocol.** The block, packed with transactional data, digital signatures and a timestamp, is broadcasted to the network's participants. The block verification process requires tremendous computing power. Public blockchains encourage the community to service the network by offering a reward for their effort – cryptocurrencies such as Bitcoin or Ether.

# How blockchain works?



# The 4 Types of Blockchain Networks Explained



## 4 types of **blockchain** networks



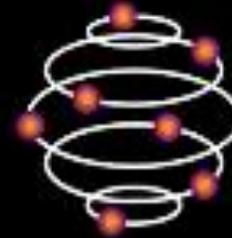
Consortium blockchains



Semi-private blockchains



Private blockchains



Public blockchains

# PUBLIC BLOCKCHAIN

**A public blockchain is a blockchain that anyone in the world can read, send transactions too and expect to see them included if they are valid,** and anyone can participate in the consensus process – the process for determining what blocks get added to the chain and what the current state is. Public blockchains are secured by cryptoeconomics – the combination of economic incentives and cryptographic verification using mechanisms such as proof of work (Bitcoin) or proof of stake (Ethereum). These blockchains are generally considered to be “fully decentralized.” One of the drawbacks is the substantial amount of computational power necessary to maintain a distributed ledger at a large scale.

## Advantages

- Public blockchains provide a way to protect the users of an application from the developers, establishing there are certain things that even the developers of an application have no authority to do.
- Because public blockchains are open, they are likely to be used by very many entities, with no third-party verification necessary.

# PRIVATE BLOCKCHAINS

**A fully private blockchain is a blockchain where write permissions are kept to one organization. Read permissions may be public or restricted to certain participants.**

## Advantages

- The consortium or company running a private blockchain can easily change the rules of a blockchain, revert transactions, modify balances, etc. For example, in some case, such as national land registries, this functionality is necessary.
- The validators are known, so any risk of a 51% attack from some miner collusion does not apply.
- Transactions are cheaper, since they only need to be verified by a few nodes that can be trusted to have very high processing power with no need to be verified by 10,000 nodes.
- Since read permissions are restricted, private blockchains provide a greater level of privacy.

## WHAT IS THE DIFFERENCE BETWEEN PUBLIC AND PRIVATE BLOCKCHAINS?

One of the questions I commonly get asked is **what is the difference between public and private blockchains?** It is easy to see why people get confused as public and private blockchains have many similarities.

- **Both are decentralized peer-to-peer networks**, where each participant maintains a replica of a shared append-only ledger of digitally signed transactions.
- **Both maintain the replicas** in sync through a protocol referred to as consensus.
- **Both provide certain guarantees on the immutability of the ledger**, even when some participants are faulty or malicious.

**There are two other types of blockchain networks being introduced – consortium and semi-private blockchains.**

## SEMI- PRIVATE BLOCKCHAINS

**Semi-private blockchains are run by a single company who grants access to any user** who qualifies, and they typically target business-to-business users. They will be similarly managed as a company would manage private web applications. Examples of semi-private blockchains could include ones for government entities for record-keeping, land titles, public records, etc.

### Advantages

- Launching a semi-private blockchain more closely resembles how a company runs a website.
  - The business case is typically well planned ahead of implementation, and supports existing business, thus lowering the risk of failure.
  - Companies can more easily integrate blockchain features into this
- article, I will provide a short explanation on how each blockchain network works, along with what are the advantages of each network.

# CONSORTIUM BLOCKCHAINS

**A consortium blockchain is a blockchain where the consensus process is controlled by a pre-selected set of nodes, for example, a consortium of 15 financial institutions**, each of which operates a node and of which 10 must sign every block in order for the block to be valid. The right to read the blockchain may be public, or restricted to the participants. Some examples of consortium blockchains include R3 (banks) and EWF (Energy). Consortium blockchains are also referred to as federated blockchains.

## **Advantages**

- Reduces transaction costs and data redundancies
- Replaces legacy systems, simplifying document handling and getting rid of semi manual compliance mechanisms

## The implementation of the Blockchain in SMEs

Use case		What the smart contract can do
<b>Financial services</b>	<b>Trade settlement</b>	Manages approval workflows between counterparties, calculates trade settlement amounts and transfers funds automatically
	<b>Coupon payments</b>	Automatically calculates and pays periodic coupon payments and returns principal upon bond expiration
	<b>Insurance claim processing</b>	Performs error checking, routing and approval workflows and calculates payout based on the type of claim and underlying policy
	<b>Micro-insurance</b>	Calculates and transfers micropayments based on usage data from an Internet of Things-enabled device (example, pay-as-you-go automotive insurance)

## The implementation of the Blockchain in SMEs

<b>Technology, media and telecom</b>	<b>Royalty distribution</b>	Calculates and distributes royalty payments to artists and other associated parties according to the contract. It concerns also SMEs.
<b>Energy and resources</b>	<b>Autonomous electric vehicle charging stations</b>	Processes a deposit, enables the charging station and returns remaining funds when complete.

## The implementation of the Blockchain in SMEs

<b>Cross-business</b>	Supply chain and trade finance documentation	Transfers payments upon multi-signature approval for letters of credit and issues port payments upon custody change for bills of lading.
	Product provenance and history	Facilates chain of custody process for products in the supply chain where the party in custody is able to log evidence about the product
	Peer-to-peer transacting	Matches parties and transfers payments automatically for various peer-to-peer applications; lending, insurance, energy credits etc.
	Voting	Validates voter criteria, logs vote to the blockchain and initiates specific actions as a result of the majority vote.

## Blockchain and IoT

As of this moment, **there is a race to develop** a reliable and fully functional platform for **the Internet of Things (IoT)**.

**However, there is a critical issue that IoT developers must solve: Security.**

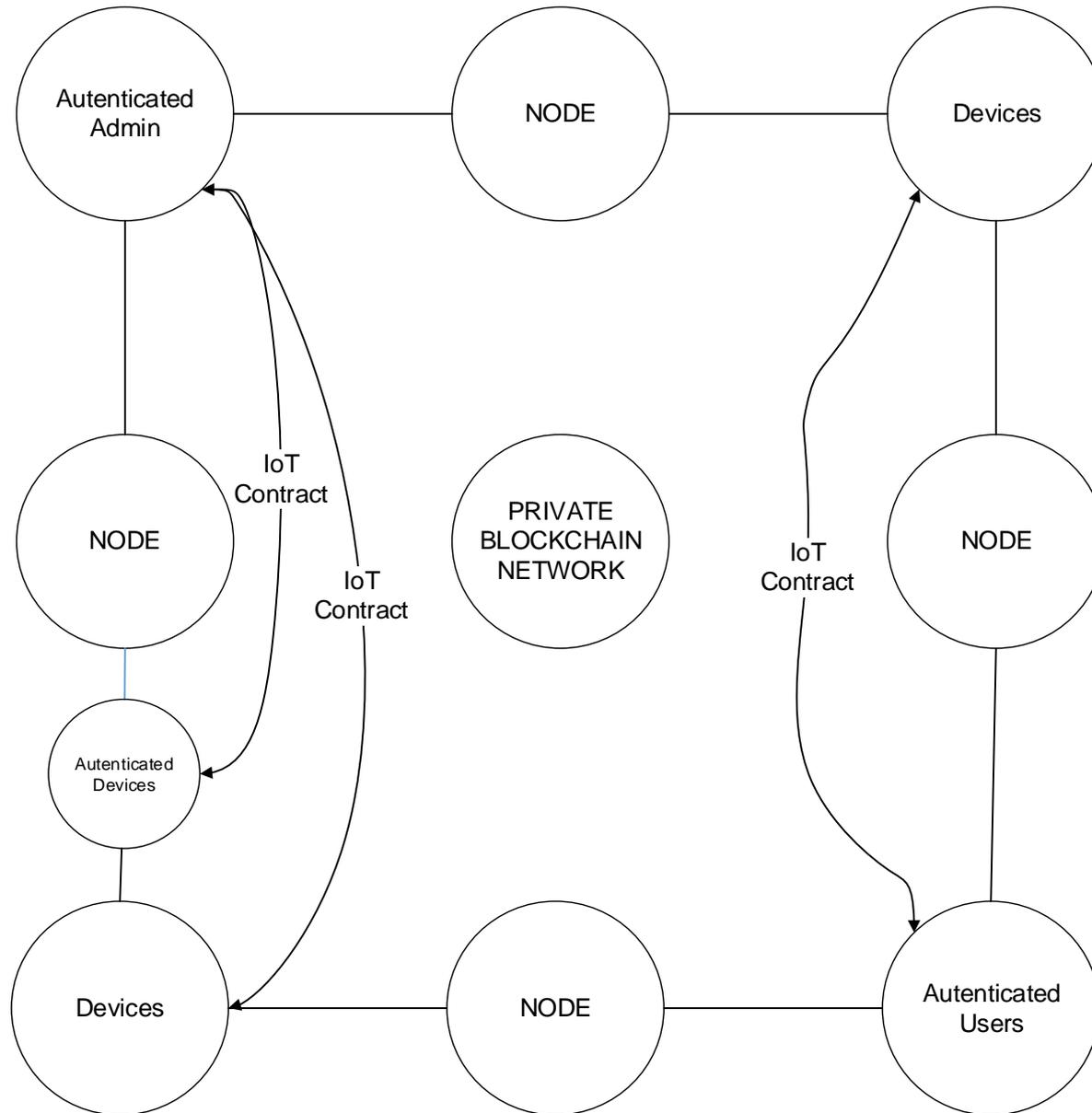
**Should someone gain access to your IoT platform?** They would control the whole ecosystem of devices connected to it: house thermostats, digital cars like a Tesla, and even purchasing systems.

*This is a scary proposition.*

Hackers could intentionally raise the temperature of your house to 100 degree Celsius. They could shut off or possibly even maneuver your car while you're in it.

**The Solution of problems the IoT is Blockchain Security!**

# Blockchain and IoT



## CONCLUSIONS

Global blockchain technologies market has reached **\$339.5 million in 2017. By 2021, it is predicted to hit \$2.3 billion.**

**Blockchain smart contracts have a strong potential** in the nearest future.

**Blockchain will eliminate bureaucracy.** Any industry still stuck with paper contracts and guilty of accumulating piles of reporting documentation can greatly benefit from this technology.

There is a race to develop a reliable and fully functional platform for the Internet of Things(IoT). **The Solution to IoT is Blockchain Security.**

**SMEs are slow in adopting technology such as Blockchain and IoT** vis-à-vis large enterprises.

Still there is a lack of knowledge of new technology in SMEs.

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A top-down view of a wooden desk with a typewriter, a notebook, a pinecone, glasses, and a pen. The text "Thank You" is written in large blue letters, and "For Your Attention" is written in smaller yellow letters below it, flanked by double yellow lines.

**Thank You**  
== For Your Attention ==