ENTERPRISE BLOCKCHAINS FUNDAMENTALS



THIS COURSE IS FOR YOU IF WANT TO:



Learn how Blockchain works



Familiarize with Blockchain Definitions



Understand what makes Smart Contracts so "smart"



Learn how to build your Enterprise Blockchain career



BLOCKCHAIN CRASH COURSE

> LESSON 1: What exactly is Blockchain

Technology

> LESSON 2: Must know (Enterprise) Blockchain

Terms

> LESSON 3: Smart Contracts Basics

> LESSON 4: Blockchain Digital Transformation



WHO SHOULD TAKE THIS COURSE?

- Senior Leadership & Decision Makers
- Software developers and startups
- ➤ Innovation Managers & Entrepreneurs
- Advisors & Business Analysts



LESSON 1

BLOCKCHAIN CRASH COURSE



ABC of Blockchain: Quick definition of blockchain

> Think of blockchain as a "special" database.

> In blockchain the data is unique and immutable forever.

> And without the need of a central control entity.

ABC of Blockchain: What can you do with it?

Let's use an example:

I am a supplier that delivered goods to a client.

To get paid I send a letter to the client asking for the due (es. \$100).





ABC of Blockchain: What can you do with it?

Question: How do I know if (and when) the letter has been delivered?

Answer: Ask the client!

Question: What if I don't trust what my client says?

Answer: Ask the post office!

Question: I don't want an intermediary. No other options are possible?

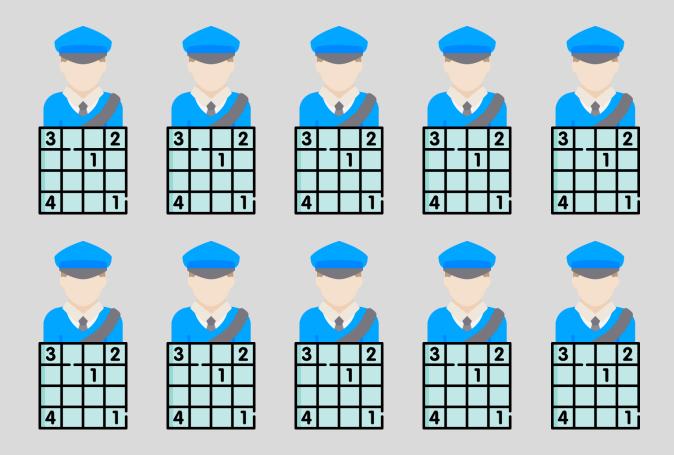
Answer: You can ask directly to the mail carrier!



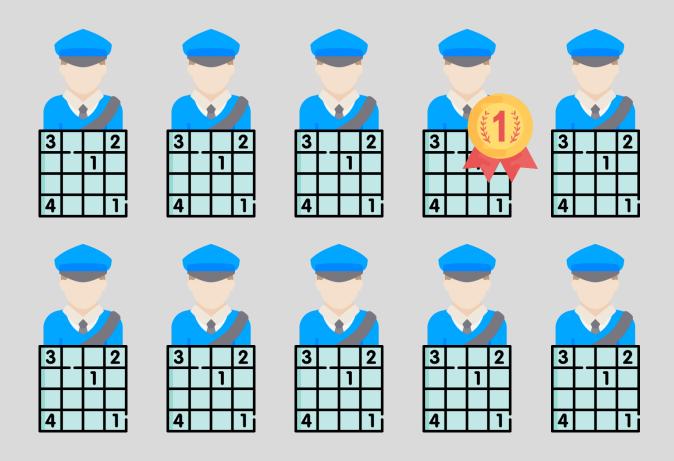
Which mail carrier should I ask?

How to get the information WITHOUT asking the post office?

Solution: The mail carriers compete to decide who will make the delivery.



Eventually someone will resolve the Sudoku



The winner makes the delivery.

The winner makes the delivery



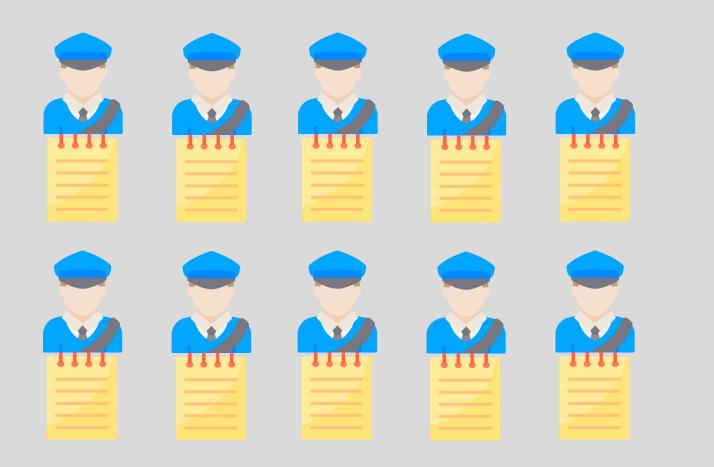


And writes the data of the delivery on his registry.

Copy of the registry is given to all the other mail carriers



Question: Which mail carrier can I ask?





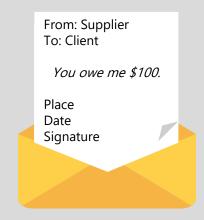
Answer: Ask **any** mail carrier!



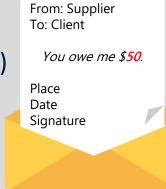
So is everything set?

So is everything set?

Not really. What happens if against my original letter...



... the client presents a different letter? (warning: the client has maliciously altered the information...)



As of today, I must ask (again) an intermediary to fix the issue.

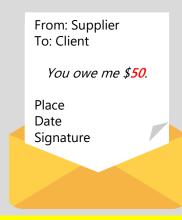
The solution

The original letter is assigned a «special» code



Cf23df207d99a74fbe169K3e5a035e633b65d94

The malicious letter is assigned a different «special» code



Ar03vt\$97de9a7sfbr257f3r8b099e824w£5a18

The winner mail carrier delivers the letter with the Cf23df207d99a74fbe169K3e5a035e633b65d94 code





Cf23df207d99a74fbe169K3e5a035e633b65d94

All mail carriers have now a copy of the letter with the code Cf23df207d99a74fbe169K3e5a035e633b65d94



The «mail carriers system» acknowledges the original as the valid letter

LESSON 2

BLOCKCHAIN CRASH COURSE



Must know (Enterprise) Blockchain Terms

- **Blockchain:** decentralized distributed ledger that allows peer-to-peer (p2p) transactions secured by cryptographic algorithms and consensus mechanisms.
- Consensus mechanism: a way to ensure that the transaction is valid without the need for a central authority, and that there is no double-spending.
- Valid transaction: parties are certain that the exchange has happened and cannot be neglected.
- **Double-spending:** the possibility for one party to 'copy-and-paste' and 're-use' an electronic transaction (e.g., payment).
- Miners/validators: network participants dedicated to validating transactions and avoiding double-spending.
- Bitcoin: cryptocurrency that runs on blockchain.
- Cryptocurrency: a digital token exchanged on blockchain using cryptographic algorithms to secure the p2p transaction.
- Token: the digital representation of a 'unit of possession' that can be exchanged between parties.
- Permissionless blockchain: blockchain protocol that allows anyone to join the network.
- **Permissioned blockchain:** blockchain protocol that requires authorization to join the network.
- Smart contract: software program that- when triggered- automatically executes instructions to transfer tokens.

LESSON 3

BLOCKCHAIN CRASH COURSE



Smart Contracts







CONTRACT

Between Supplier and Client

When goods arrive and are accepted, receive and pay invoice of 100 euros.

Signed Supplier

Signed Client

Smart Contracts







```
contract Token {
    mapping(address => uint256) balances;
    using Balances for *;
    mapping(address => mapping (address => uint256)) allowed;

    event Transfer(address from, address to, uint amount);
    event Approval(address owner, address spender, uint amount);

function balanceOf(address tokenOwner) public view returns (uint balance) {
        return balances[tokenOwner];
    }

function transfer(address to, uint amount) public returns (bool success) {
        balances.move(msg.sender, to, amount);
        emit Transfer(msg.sender, to, amount);
        return true;
}
```

Smart Contracts





```
contract Token {
    mapping(address => uint256) balances;
    using Balances for *;
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Source: https://solidity.readthedocs.io/en/latest/solidity-by-example.html

LESSON 4

BLOCKCHAIN CRASH COURSE



9 Verticals of **Blockchain Transformation**

- 1. Technology
- 2. Media
- 3. Law and Crime
- 4. Transportation
- 5. Governmental Services
- 6. Human Rights
- 7. Finance
- 8. Contracts
- 9. Entertainment

Blockchain Digital Transformation



Cyber Security Protection against DDoS attack, Ledger system



Internet of Things Implementing IoT system within industries, IoT applications for transactions.



Cloud Storage Extra security with decentralized network, low transaction costs.





Advertising Low cost advertising and marketing, no intermediaries.

Blockchain

Transformation



Police/Law Decentralized gaming platforms, Preservation of evidence, no enable players to trade in-game falsification data, time stamps, chain of facts.

Law and Crime



Business Transportation Access to trip data and tracking the path



Power Management Low cost energy, peer to peer energy transfers, utility



Entertainment



Improving implementa tion, automating and securing AI tech.









gun possession

Tracking criminal IDs and

preserving ownership of

Transportation

Tracking vehicles supply chain management, Production and sales history



Public Transportation Accurate payments, ride sharing, streamlining rides



Ownership rights, preserving copyright, smart contract system for artist



No illegal downloads, proper channel for artists



Inheritances Validity of wills and smart contract system to ensure



Property or Land transparency in payment ownership changes.



in banking system and

money transactions

Financial Protection

Contracts



Banking Interface



Contributions

integrity, Ensuring safe fund

Voluntary Organization

Tracking all donations and

Reduces the complexity of

ensuring the integrity.

Governmental

Services

Transparent voting system, minimization of fraud. Citizen



Traveling boarding information,



Patient database

management, Drug supply chain management, Medical fee transactions privacy



Education Proper educational channel Digitization, academic





documentation and contracts. Smart contract defines the rules of the



Insurance agreement preservation validating the agreement and transaction processes.



Finance

More accuracy, better interface, security in

Identity verification, history of employees, payment

Human

Rights and

Contributions

2023 Leading Sectors

- Supply Chains
- **Fintech**
- Retail
- **Trading**
- Mining
- Healthcare
- Insurance

and more

Enterprises Which Are Implementing Blockchain Technology



Patented blockchain technology for time stamping data.



Facebook

Exploring the use of blockchain to enhance data security and users



Exploring the use of blockchain technology to enhance cloud service security and for data protection,



Data

Integrity

Using blockchain to enhance intellectual rights management.



Ford

Leveraging blockchain technology to enhance the mobility of technologies.



Planning to use blockchain technology to enhance autonomous driving technology.



Bristish Airways

Implementing blockchain to manage flight data as identity.



AIA Group

Launched the first of its kind bancassurance for sharing policy data.



UnitedHealthcare

Using blockchain technology to improve doctors directories to enable accurate insurance claim fillings.



Using blockchain technology for storing patients medical records for insurance purposes.

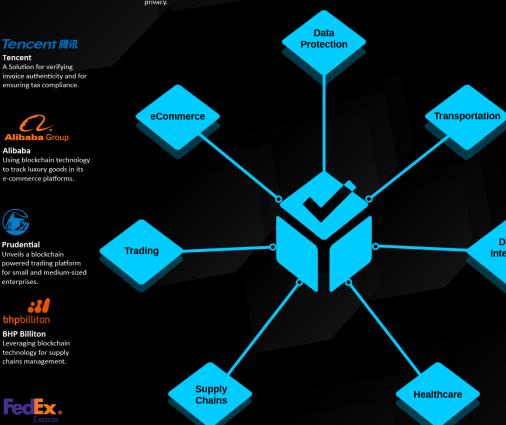


Intends to use blockchain technology to enhance supply chain management when it comes to electronics shipments



Walmart

Using blockchain technology to track product movement from farmers to stores.





Using blockchain technology in supply management to track baby food products.

Working on blockchain

solution for settling customer disputes.



Blockchain system for tracking movement of shipments between ports.



Blockchain powered logistics monitoring and management solution

BONUS & NEXT STEPS

BLOCKCHAIN CRASH COURSE



Bonus #1 Blockchain vs Database

- Authority
- Integrity
- Write Access
- Cost
- Trust

Is Database Enough? A comparison Between Blockchain and Database

No one has the central authority.



Modifying data or asset is nearly impossible.



All the data or activity is out in the open for everyone to see.



Cuts down the excessive costing.



Blockchains are slow.



Suited for an organization where users don't trust each other.





Selected groups of individuals have authoritative control.



Data or assets can be easily changed.



All the data or transactions are hidden from each other.



Implementing process is costly.



Databases are comparatively faster.



Suited for an organization where there is mutual trust.



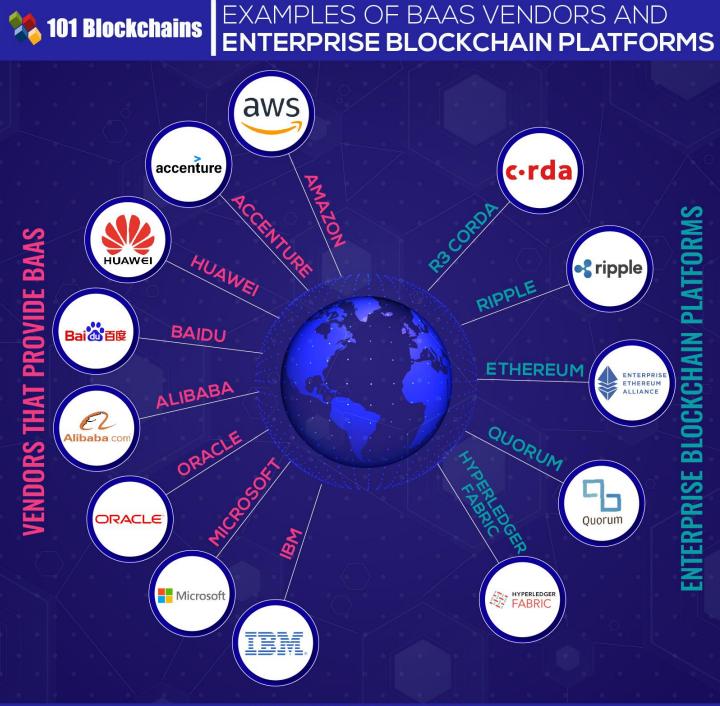
Bonus #2 Enterprise Blockchains

BaaS Vendors:

- IBM
- ORACLE
- AWS
- ALIBABA
- ACCENTURE

Enterprise Platforms:

- Fabric
- Corda
- EEA
- Quorum
- Ripple





ARE YOU READY TO JOIN THE BLOCKCHAIN REVOLUTION?

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Enrico Camerinelli VP Research

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