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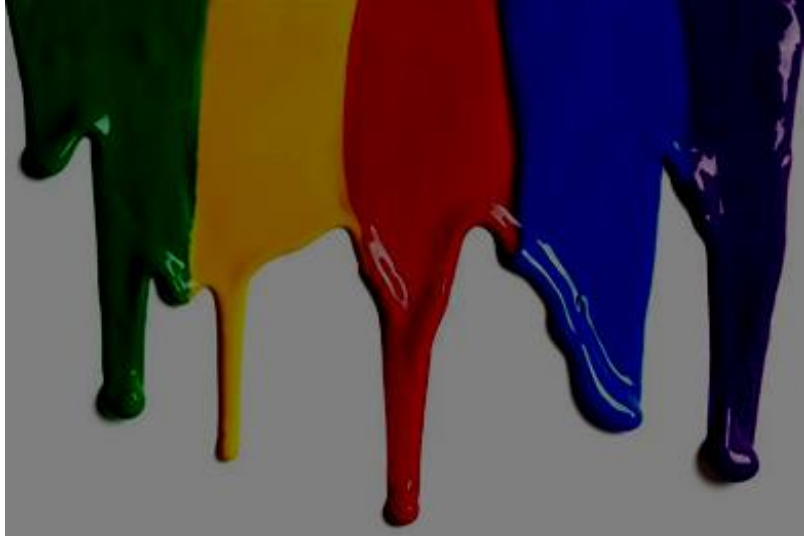

Encryption and notarization of documents with blockchain and secret sharing

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Stay ahead
WITH OUR TEAM

500+ PEOPLE
DELIVERY MANAGEMENT

Continuous training programs, development paths and career counseling. Transfer of innovation processes on over 350 complex projects per year.

40+ R&D

Committed to cutting-edge ICT issues. Innovation is the driver of the Eustema R&D transformation

100 + Clienti

PAC e PAL
Utilities
Telco
Transports
Energy
Media

70% of ours Customers has been working with us for over 10 years.

3 locations

Offer segmentation. Strong relationship with our audience through our presence in the field. We build solutions based on innovative technological architectures.

30 years

of ICT experience. A history of innovation, products and successful projects.

The Investment Compact decree certified us an Innovative Company.

Eustema Traning Lab

640 professional certifications

20.000 training hours

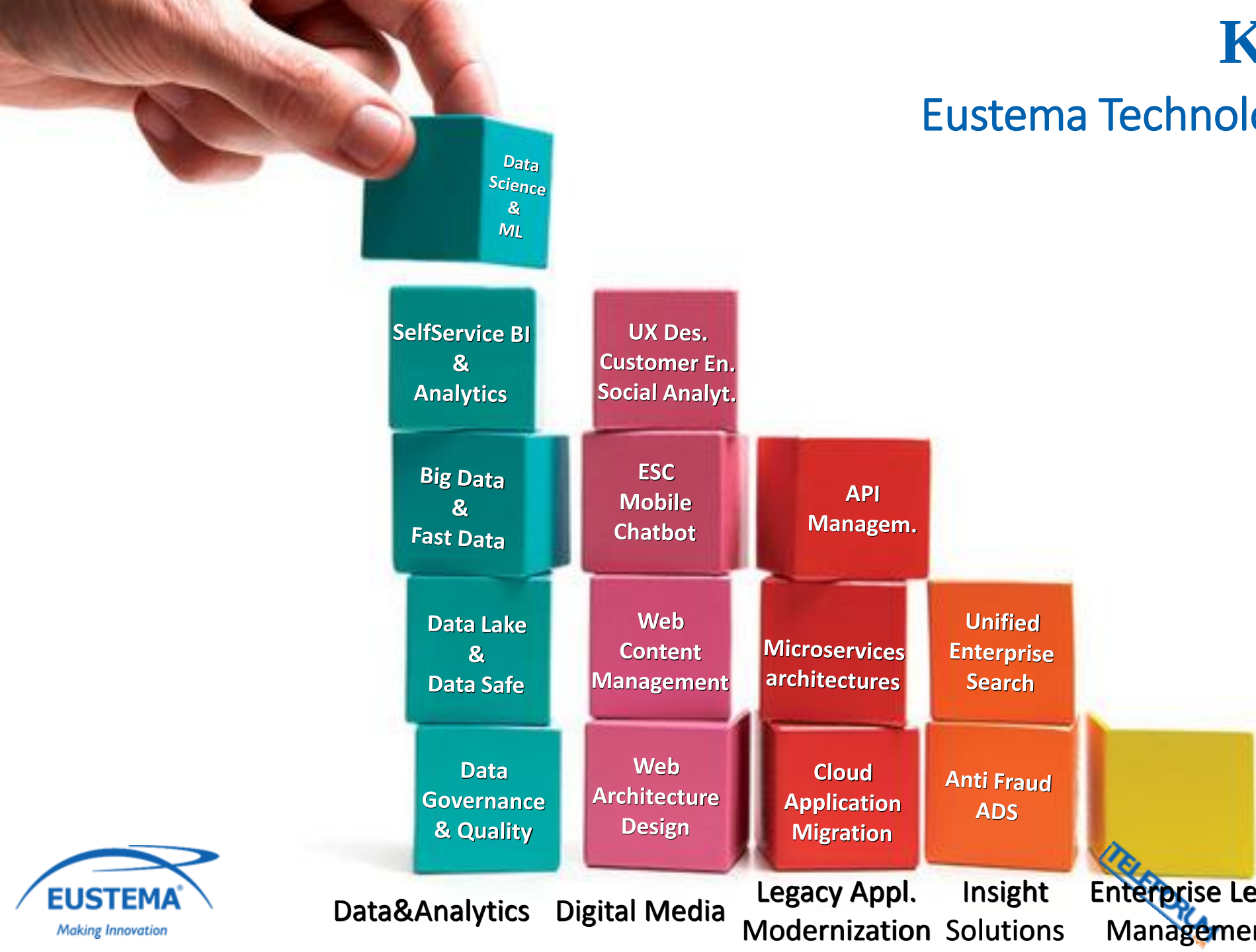
90% **trained people** per year

Eustema Academy

Over 6 courses per year, 15 classroom students,
collaboration with universities and research centers

Key Offering

Eustema Technological Building Blocks



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CheckLockBlock Project

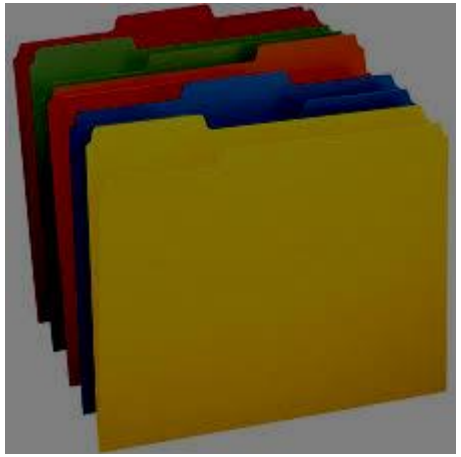
CheckLockBlock is a research project carried out at Eustema.

Project basis: blockchain for document notarization.
Project objective: "time capsule"

Use case: public competitions.

Need for an application that certifies the loading and integrity of a document at a certain point in time.

"Time capsule": absolute confidentiality on the content of the document before the end of the competition.



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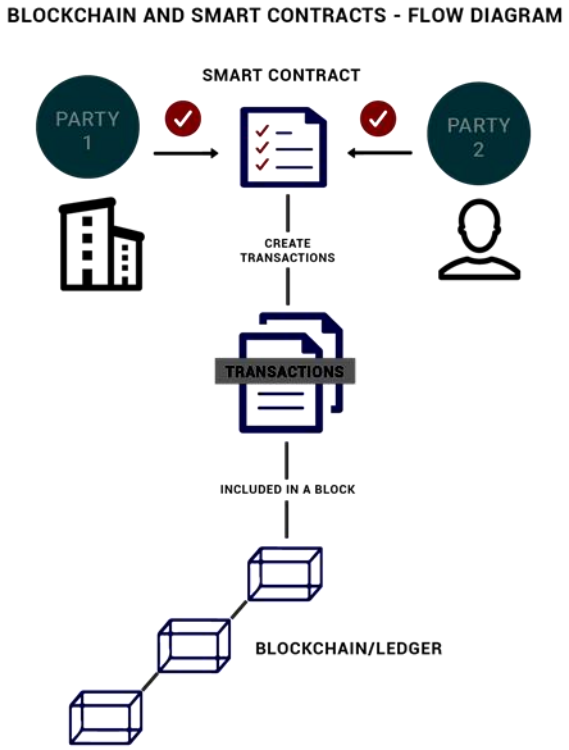
Hyperledger and Smart Contracts

Hyperledger Fabric is a permissioned blockchain programming framework that supports smart contracts.

Smart contracts are programs that perform predefined actions when certain system conditions are met. They provide a transaction language that allows the user to change the state of the distributed ledger.
The Hyperledger Fabric Chaincode allows the user to create transactions in the distributed register of the network and to update the world state of the goods.



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Shamir Threshold Scheme

Let n and t be two positive integers such that t ≤ n. A threshold scheme (n, t) is a method of sharing a key k between a set of n participants such that:

- Each group of cardinality greater than or equal to t manages to reconstruct the key k

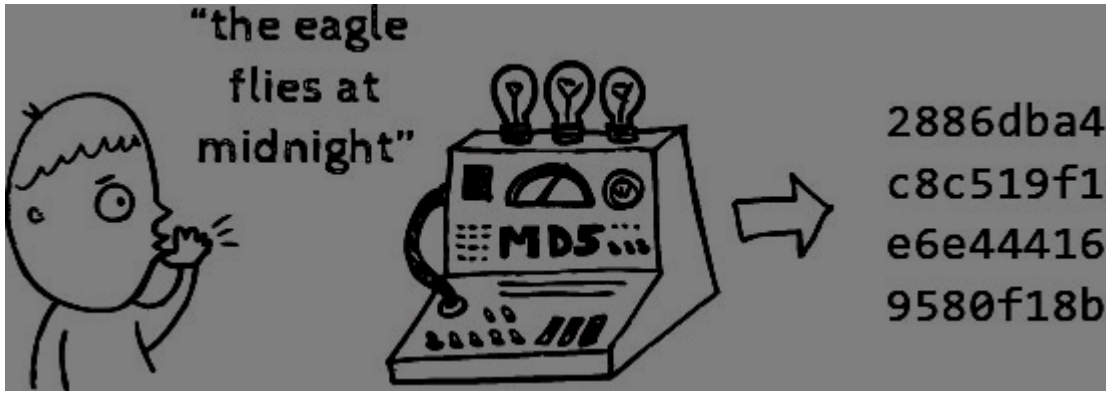
- Each group of cardinality lower than t fails to obtain any information regarding the secret k

Shamir's scheme is based on the construction of a polynomial a (x) of degree t-1 such that a (0) = secret.

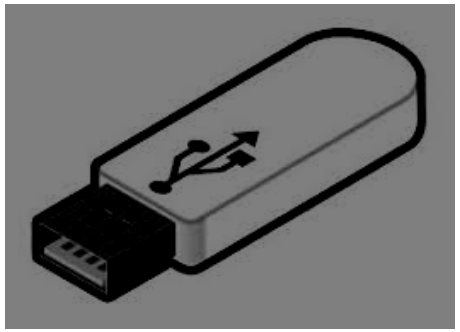
It is a safe scheme as it is based on a well-proven mathematical property. Given k <t points there are infinite polynomials of degree t that interpolate these points.

Project overview: Loading private document

The hash of the plaintext is done and uploaded to the blockchain.



The document is encrypted.



The hash of the encrypted document is uploaded to the blockchain.

The encrypted document is saved on an external memory.

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Project overview: Loading list and distributing shares

A list containing the names of the participants in the Shamir threshold scheme is published. The list hash is uploaded to the blockchain.

Each share is encrypted with the user's public key to which it will be sent through a transaction on the blockchain.

Project overview: Secret reconstruction and decryption

Each user can access his share and decrypt it with his own private key.

When a sufficient number of users agree, they can rebuild the secret.

As soon as users possessing the secret come into contact with the private document, they can decipher it and certify that the file has not been modified thanks to the hash loaded on the blockchain.

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Thank you for your attention.

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