

NuCypher KMS: Decentralized Key-Management System

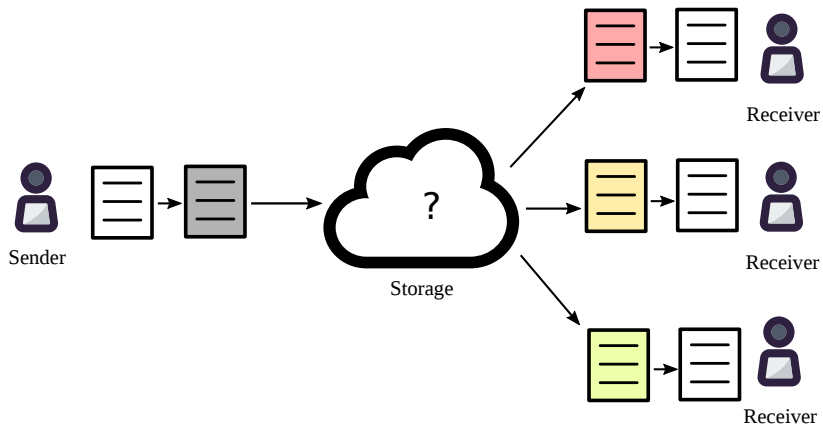
Michael Egorov, CTO

BPASE, 26 Jan 2018



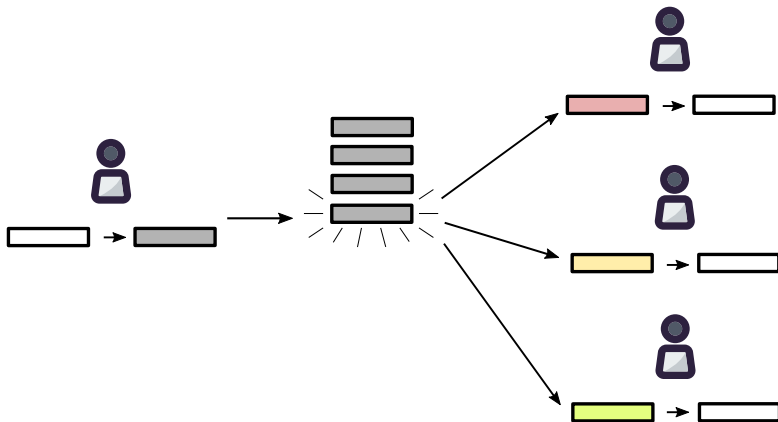
Why

Encrypted file sharing



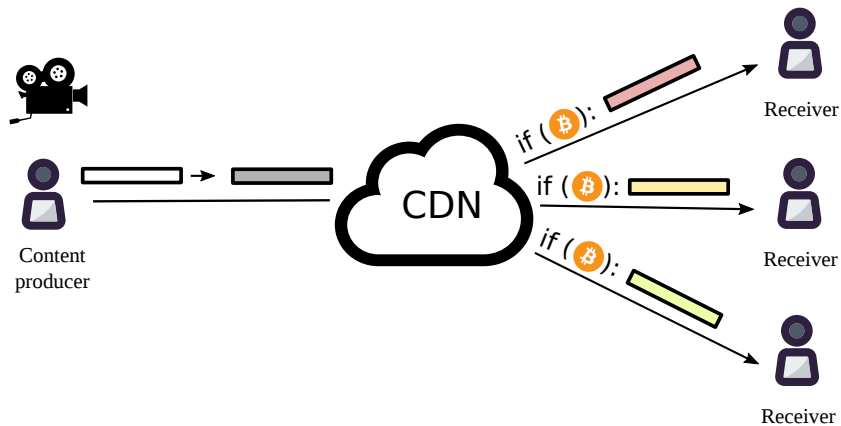
Why

Encrypted multi-user chats



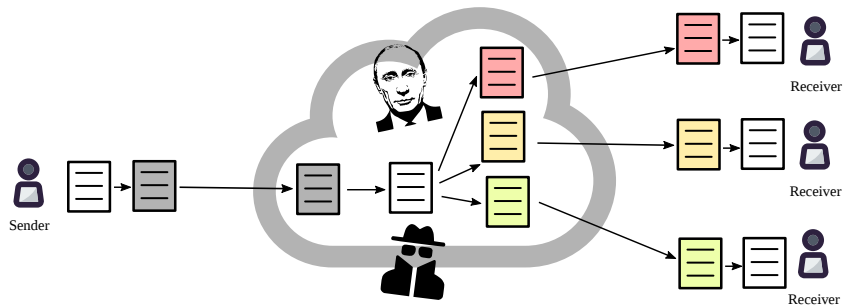
Why

Decentralized Netflix



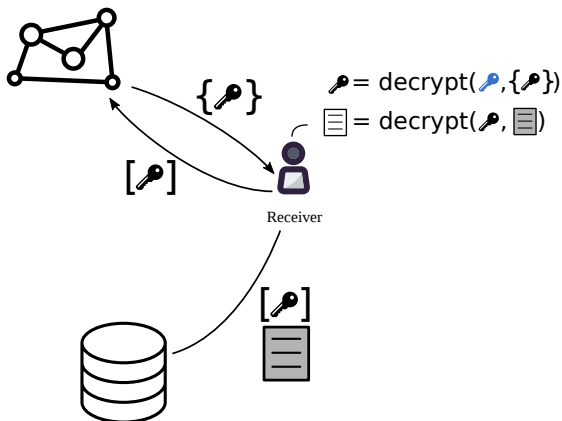
Central server + TLS

Data vulnerable to hackers, state actors etc

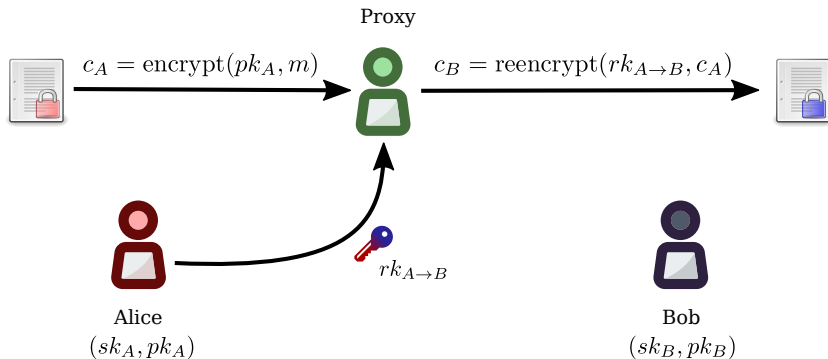


Solution

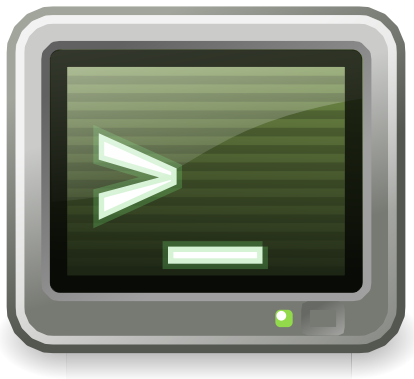
Proxy re-encryption + decentralization



What is proxy re-encryption (PRE)

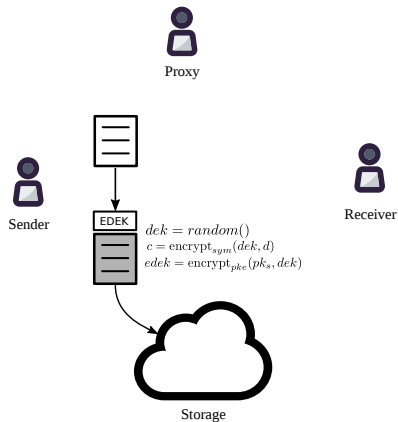


PRE demo



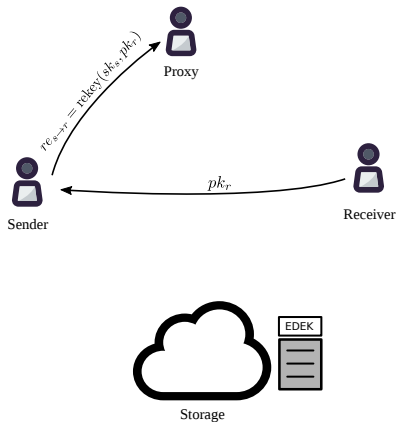
Centralized KMS using PRE

Encryption



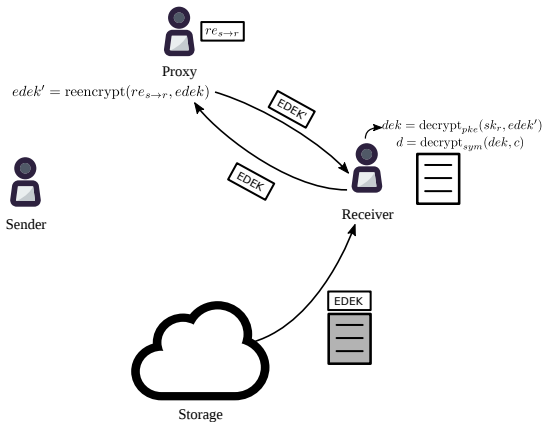
Centralized KMS using PRE

Access delegation



Centralized KMS using PRE

Decryption



KMS token

Purpose

- Splitting trust between re-encryption nodes (more tokens = more trust and more work);
- In-network means of payment for deploying policies;
- Proof of Stake for minting new coins according to the mining schedule;
- Security deposit to be at stake against malicious behavior of nodes

KMS token

Mining

Mining reward:

$$\text{reward} = \frac{\text{locked_tokens} \times \text{reward_rate}}{\sum_{\text{all miners}} \text{locked_tokens}} + \sum_{\text{this miner}} \text{miner_fees}$$

Early users

Decentralized marketplaces:

- Datum.

Decentralized databases:

- Bluzelle;
- Fluence;
- Wolk.

Medical data sharing

- Medibloc;
- IRYO;
- Medixain;
- Wholesome.

IoT

- Spherity (together with BigchainDB).

Cryptocurrency keys

- Coval Emblem Vault

Investors



compound



Satoshi•Fund



AMINO Capital

**semantic
capital**

BASE



1kx

CoinFund

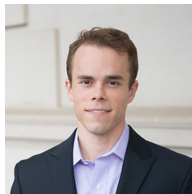


Blockchain Partners Korea

FIRST MATTER

Team

Founders



Advisors



How to contribute, learn



Website: <https://nucypher.com/blockchain.html>

Github: <https://github.com/nucypher/>

Slack: <https://nucypher-kms-slack.herokuapp.com/>

Whitepaper: <https://arxiv.org/abs/1707.06140>

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