

BLOCKCHAIN eDELIVERY PROTOCOL

UN/CEFACT CHAIN USE-CASE

This presentation provides the understanding to blockchain eDelivery protocol use-case basic technical specifications and discovers aspects of legal, governance and technical interoperability.



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CURRENT CEF eDELIVERY SOLUTION

The current ***CEF eDelivery** solution is based on a model, where the Access Points of eDelivery implement an electronic data and documents exchange protocol where trust is established between two public administrations Access Points and the electronic data and documents exchange is activated.

*4THTECH BLOCKCHAIN eDELIVERY PROTOCOL SOLUTION

4thpillar technologies solution enables ***Blockchain eDelivery Protocol** to leverage trust directly from the blockchain. The protocol is based on a distributed model where the electronic data and documents exchange process runs between blockchain wallets, where private and public cryptographic keys are used for transaction authentication.

4THTECH IDENTITY MECHANISM

To provide an option for blockchain address ownership verification, the verification mechanism was created, which can lead to individual digital identity and authenticate verified connection between a blockchain wallet and a person.

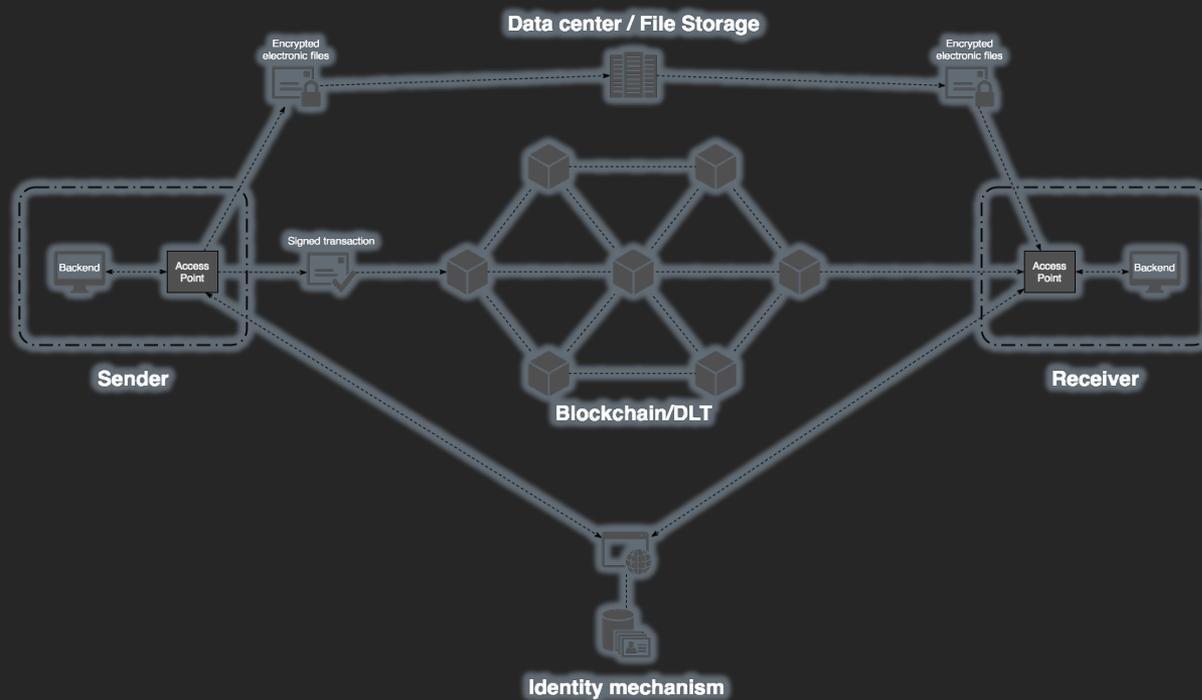
*CEF (i.e. Connecting Europe Facility)

*CEF eDelivery (i.e. electronic data and documents exchange)

*4THTECH (i.e. 4thpillar technologies)

*BLOCKCHAIN eDELIVERY PROTOCOL (i.e. FOURdx)

- (1) Similar structure as with CEF eDelivery.
- (2) Based on a distributed model with Access Points.
- (3) Runs in the background and can connect to existing systems.
- (4) Transaction trust is leverage directly from the blockchain/DLT.
- (5) Electronic data and documents exchange process runs between blockchain wallets.
- (6) Private and public cryptographic keys are used for transaction authentication.
- (7) AES with a combination of RSA encryption algorithms is used to encrypt the electronic data and documents.
- (8) Address ownership verification mechanism provides digital identity function.



***AES** (i.e. advanced encryption standard)

***RSA** (i.e. public key cryptosystem)

INTRODUCTION

To achieve GDPR compliance, the protocol has been developed from the start alongside with external legal experts. The protocol follows procedures and security measures regarding personal data under the EU General Data Protection Regulation.

GDPR AS THE MAIN CHALLENGE

- (1) GDPR demands responsibility for ensuring compliance, what can become demanding, especially in the permission less public blockchain network.
- (2) GDPR allows personal data processing only in the case of explicit authorization by the subject.
- (3) GDPR invokes the right of data erasure, which can be especially tricky when dealing with blockchain-ledger.

BLOCKCHAIN eDELIVERY PROTOCOL SOLUTION

- (1) Every transaction is authorized by the user;
- (2) blockchain network is used only for transactions links to encrypted electronic data or documents, that only the receiver can open using his or her private key;
- (3) no personal information is located in the blockchain transaction;
- (4) send encrypted electronic data or documents are stored in the off-chain data repository (i.e. data repository of user choice and control) and can be erased on the user request;
- (5) the protocol records only links to encrypted files and hashes of the encrypted content on the blockchain, what safeguards the rights of individuals to confidentiality and privacy, and;
- (6) the sender and the receiver jointly assume responsibility for complying with the GDPR and establishing a lawful basis.

INTRODUCTION

4thpillar technologies **Blockchain eDelivery Protocol** is deployed as an application operating currently on ***Ethereum** and ***SI-Chain** platforms. As such, the **Blockchain eDelivery protocol** transaction governance falls under the DLTs governance of its deployment.

THE GOVERNANCE CHALLENGE

- (1) The challenge lies in single and multi cross-platform DLT governance interoperability, and;
- (2) electronic data and documents user control.

BLOCKCHAIN eDELIVERY PROTOCOL SOLUTION

- (1) Blockchain eDelivery protocol can be deployed on a different DLT platform, so there is only a matter of choosing the platform that will be most compatible and Governance interoperable according to deployment needs.
- (2) As the protocol uses DLTs only for recording links to encrypted files and hashes of the encrypted content exchanged between sender and the receiver, and the content can be accessed only with the private key, the protocol transaction Governance is completely in the user's hands.

***ETHEREUM** (i.e. decentralized open source blockchain)

***SI-CHAIN** (i.e. Slovenian national test blockchain infrastructure)

***DLT** (i.e. distributed ledger technology)

INTRODUCTION

To support the migration of *CEF eDelivery to DLTs and to help build the foundations for safe, reliable cross-border digital eDelivery services, the technical interoperability between current and proposed systems is needed.

*CEF & *eIDAS INTEROPERABILITY CHALLENGE;

- (1) Full implementation technical interoperability between existing systems and blockchain eDelivery protocol.
- (2) Using blockchain as a trust source of the transactions.

BLOCKCHAIN eDELIVERY PROTOCOL SOLUTION;

- (1) The development of a new Access Point, where trust will be provided by the blockchain. The new Access Point will behave in a similar way that current *CEF Access Point but with the main difference of interacting directly with the blockchain, while maintaining the same functionalities.

*CEF (i.e. Connecting Europe Facility)

*eIDAS (i.e. Electronic Identification, Authentication and Trust Services)

INTRODUCTION

According to discussion paper on semantic and technical interoperability Proposed by the eHealth Governance Initiative, 2012, technical interoperability means the ability of two or more information and communication technology applications, to accept data from each other and perform a given task appropriately and satisfactorily without the need for extra operator intervention.

MULTI DLT CHALLENGE

- (1) The challenge is how to interact between different DLTs and;
- (2) how to be compatible with the Multi-DLT systems.

BLOCKCHAIN EDELIVERY PROTOCOL SOLUTION

- (1) Adoption to a single DLT standard;
- (2) Adaptation to multi DLTs is possible using different methods;
 - the blockchain eDelivery protocol uses hosted Ethereum node on *INFURA over *JSON-RPC protocol, to connect to Ethereum chain
 - the blockchain eDelivery protocol uses *gRPC to connect to Si-Chain.
- (3) Regarding the DLT and Multi DLT interoperability, the same connection principles with specific modification will apply.

*INFURA (i.e. Ethereum and IPFS gateway)

*gRPC (i.e. universal RPC framework)

*JSON-RPC (i.e. remote procedure call protocol)

After two years of the protocol MVP testing, the concept has been validated and tested on early adopters and it's currently capable of; (1) connecting senders and receivers by executing electronic data and documents exchange; (2) performing eDelivery based on the current EU guidelines, and; (3) archiving securely encrypted data.



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Whitepaper: <https://www.the4thpillar.io/documents/whitepaper.pdf>

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