

# 4THPILLAR TECHNOLOGIES

## Project White Paper 3.0

***Executive Summary--*** The internet changed the way we live, it opened the ways of unlimited communication and revolutionized access to information, but it failed greatly regarding our digital freedom. Instead of providing trust, granted privacy, security, peer-to-peer communication, simplification, and digital money, it evolved into a system of global intermediaries, that manipulate our private data and charge a percentage for every interaction. There is a new technology at the horizon called blockchain, that in its core excludes any intermediary's, it brings peer-to-peer communication, online trust, security, privacy, authenticity, identity, synchronizes ledger and much more. 4thpillar technologies (i.e. 4thtech) implements blockchain-based solutions and facilitates digital transformation. This white paper was written as a hybrid addressing the 4thpillar technologies product benefits and solutions.

Dr. Tali Rezun, founding council chair

*Keywords: 4thpillar, 4thtech, fourdx, fourid, fours, four-token, internet, digital transformation, blockchain technology, decentralization, peer-to-peer, online trust, online security, online privacy, DLT, eDelivery, document exchange, notarisatation*

### 1. INTRODUCTION

Exchanging sensitive electronic data and documents should be as easy as exchanging information. Blockchain technology proposes the ideal foundation to simplify digital value-holding file and documents exchange. To address this issue in 2017, 4thpillar technologies (i.e. 4thtech), proposed and later developed a safe, fast cross DLT blockchain-based solution, which leverages trust provided by the blockchain and provides secure, immutable, instant cross-border electronic data and document exchange. To provide an option for blockchain address ownership verification, the identification mechanism later was constructed in 2018, which can authenticate verified connection between a blockchain wallet and a person. Notarisatation is also an essential part of the 4thtech eDelivery ecosystem and provides unique digital data or document timestamp and authenticity verification. Our products are reducing the usage of paper and actively help the environment. The

applications of our services are limitless, as they could be applied to any industry. The article from The Economist ("The second half of the internet," 2019) predicts that billion new internet users will be joining the rest of us soon, there are countries such as Mauritius that are skipping centralized digitalization and want to adopt blockchain technology directly, so now more than ever a significant internet advancement is needed.

***Validation--*** The blockchain eDelivery protocol (i.e. FOURdx) concept has been validated with a working prototype, tested on early adopters and recognised as blockchain development suited for European Union needs.

*In May 2018 Adriatic council awarded Dr. Tali Rezun with the Beyond 4.0 award for his dedication, promotion and accomplishment in the field of science, new technologies and innovation for the 4THPILLAR Blockchain platform. (Adriatic Council | BEYOND 4.0 – LJUBLJANA, 25.05.2018. KRISTALNA PALAČA (BTC), n.d.)*

## 2. BLOCKCHAIN TECHNOLOGY

According to *Economic Commission for Europe Executive Committee Centre for Trade Facilitation and Electronic Business Blockchain in Trade Facilitation: Sectoral challenges and examples*, 2019, electronic commerce often involves transactions between parties where there is a need to establish reliability in the exchange and transparency. The Economic Commission for Europe, also points out, that Blockchain, as a type of distributed ledger, ensures tamper-proof digital transactions through the use of cryptographic technology and automated consensus. Blockchain provides a decentralized and secure shared digital ledger, which gives participating parties a way of validating information related to a transaction. In doing so, it speeds up the process and cuts out intermediaries and costs. Blockchain is made from a trail of validated facts. These facts can be anything from money to information. As part of this digital system of record-keeping, each transaction and its details are validated and then recorded across a network of computers. Everyone who has access to the distributed ledger receives this information and the parties agree on the accuracy before the block is replicated, shared and synchronized among the entities. A Blockchain is virtually impossible to tamper with since each block of information references the block before it. In an age when trust is both elusive and held at a high premium, Blockchain presents a way to confirm, validate and authenticate both values and events. Smart contracts are a code or rules written into a digital program, which determines what happens when digital assets come in or when certain conditions are met. Blockchain technology is one of the most promising developments in the information technology (i.e. IT) domain. According to *(Blockchain Technology Market Size, Share | Industry Report, 2019-2025*, n.d.), the global blockchain technology market size was valued at 1,590.9 million in 2018 and is expected to grow at a CAGR of 69.4% from 2019 to 2025.

## 3. E-DELIVERY

According to *Connecting Europe: CEF eDelivery supports trans-European multilingualism*, n.d. , eDelivery is a network of nodes for digital

communications. It is based on a distributed model where every participant becomes a node using standard transport protocols and security policies. eDelivery helps public administrations to exchange electronic data and documents with other public administrations, businesses, and citizens, in an interoperable, secure, reliable and trusted way. It is one of the building blocks of the Connecting Europe Facility (*Connecting Europe: CEF eDelivery supports trans-European multilingualism*, n.d.). These building blocks are reusable specifications, software, and services that will form part of a wide variety of IT systems in different policy domains of the EU.

### 3.1. BLOCKCHAIN E-DELIVERY

Blockchain eDelivery is a network of nodes for digital communications and document/files exchange. It is based on a decentralised model where files exchange process runs between blockchain wallets. Private and public cryptographic keys are used for transaction authentication. Blockchain eDelivery has significant security advantages, comparing to traditional eDelivery. FOURdx is the world first developed and tested blockchain eDelivery protocol capable of; (1) connecting senders and receivers by executing document exchange; (2) performing eDelivery based on the current EU guidelines, and; (3) archiving securely encrypted data.

## 4. THE STORY BEHIND THE BRAND

According to many, there are three fundamental technology developments in human history; (1) the invention of electricity; (2) the invention of the microprocessor, and; (3) the invention of the internet. We are certain, that the invention of blockchain technology is the fourth fundamental technology pillar, which revolutionary applications will yet to be revealed to the world.

### 4.1. THE INNOVATION

The innovation and ingenuity reveal from the fact, that the *blockchain eDelivery protocol* does not

store the transmitted electronic data and documents on the blockchain. The electronic data and documents are stored off-chain. The protocol records links to encrypted files and hashes of the encrypted content on the blockchain. This safeguards the rights of individuals to confidentiality and privacy. Designed and built completely by the *4thpillar technologies*, the protocol is fully operational, ready for testing and provides the core technology solutions for further development blockchain eDelivery.

## 5. PRODUCTS AND DEVELOPMENT

Up to now *4thpillar technologies* developed and deployed five important blockchain-based use-cases; (1) blockchain eDelivery protocol (i.e. FOURdx); (2) digital identification mechanism (i.e. FOURid); (3) blockchain notarization service (i.e. FOURns); (4) 4thtech add-on wallet (i.e. Google Chrome extension with build-in asset management), and; (5) four-token (i.e. TTS, MTO & GAS).

## 6. BLOCKCHAIN E-DELIVERY PROTOCOL

**Introduction--** Blockchain eDelivery has significant advantages, comparing to traditional eDelivery. It 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.

**Current 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, which ensures secure and reliable data exchange. Trust is established between two public administrations' Access Points and the electronic data and documents exchange is activated.

**4thtech Solution--** *4thpillar technologies blockchain eDelivery protocol* (i.e. FOURdx) leverage trust provided by the blockchain and its capable of; (1) connecting senders and receivers by executing electronic data and documents exchange; (2) performing eDelivery based on the current EU

guidelines; (3) archiving securely encrypted data, and (4) following the GDPR guidelines.

**Solution Design--** The protocol, was built in *Solidity*, tested on *Kovan* network and implemented on *Ethereum* main net in Q3 2018.

### 6.1. THE TRANSACTION BUNDLE

**Introduction--** While there are numerous advantages to blockchain networks, there are also issues regarding scaling and transaction fees. Blockchain networks are evolving towards faster, reliable and more affordable systems, but for now, innovative solutions are called upon.

**4thtech Solution--** To conserve blockchain network transactions, a settlement service was developed, which bundles signed multiple transactions together and settles them on the blockchain (i.e. as one transaction). Once the transaction has been settled, the transaction is concluded.

**Scalability--** The bundling of transactions enables our platform to scale as the overall number of transactions generated on the designated blockchain network is kept at a minimum.



**Quote--** “The cost of settlement per transaction drops significantly with the number of transactions reaching around 20.”

Boris Savic, Olaii

### 6.2. HOW DOES IT WORK?

For easier *blockchain eDelivery protocol* (i.e. FOURdx) understanding operational segments

were created; (1) the electronic data and documents are uploaded to the FOURdx API (i.e. currently limited to 20MB file size); (2) the electronic data and documents are stored in the repository; (3) the user is provided with the “link” of the saved location; (4) the link is sent to the blockchain, and; (5) the recipient can download the electronic data or documents and decrypt it with his private key saved in the browser’s *4thtech add-on*.

**Quote--** “I see amazing possibilities in 4THPILLAR TECHNOLOGIES products. The FOURdx, eDelivery serves as a system for sensitive document distribution between organizations and individuals and is based on blockchain technology. A truly innovative and amazing solution.”

Igor Zorko, ZZi

## 7. DIGITAL IDENTITY MECHANISM

**Introduction--** There is a constant need for online identity verification, and despite the move towards digital transactions, there is still the need to use physical identity documents. According to Economic Commission for Europe Executive Committee Centre for Trade Facilitation and Electronic Business Blockchain in Trade Facilitation: Sectoral challenges and examples, 2019, blockchain holds promise in this regard and could be used to create and verify digital identities, for individuals and organizations. eIDAS (i.e. electronic IDentification, Authentication and trust Services) is an EU regulation on electronic identification and trust services for electronic transactions in the European Single Market. It was established in EU Regulation 910/2014 of 23 July 2014 on electronic identification and repeals directive. 4thtech digital identity mechanism (i.e. FOURid) will leverage protocols such as eIDAS and other government established verifications protocols.

**4thtech Solution--** Blockchain eDelivery identity mechanism (i.e. FOURid), derives as a direct result of the existing *blockchain eDelivery protocol* (i.e. FOURdx). The identity mechanism is capable of individual wallet address verification from the authorized third party (i.e. employer, state, motor vehicle licencing department, etc.). A link is

created between an individual (or organization) and their wallet, which holds the content and digital assets.

**Solution Design--** Designed and developed from the ground-up as a web application with web API, the current solution is fully operational and offers; (1) user on-boarding authorization through a KYC identification process; (2) receiver public RSA key storage; (3) verified connection between the user and his or hers blockchain wallet.

**Further Development--** The upgrade of the existing identity mechanism is in development, focusing at identity verification between organization and individual (e.g. the state and the citizens, schools and students, etc.), to enable; (1) fulfilment of the digital identity request form by the individual, which results in wallet creation; (2) the individual identification (i.e. KYC) using either personal identification, video call or some other already established method (i.e. eIDAS); (3) issuing of unique KYC verification by the organization; (4) sending of digital identity encrypted verification data package by the organization, through the smart contract to the receiver; (5) receiving and decryption of the verification data package by the individual/receiver; (6) the confirmation of identity data package by the individual by imputing the unique KYC verification code in the system; (7) system data verification and individual identity conformation. (Rezun & Jazbec, n.d.)

## 8. NOTARISATION SERVICE

**Introduction--** 4thtech notarisation service is able to leverage the power of cross DLT blockchains and facilitate source and time confirmation for digital data and documents. The notarisation function will be soon available for testing as a part of the blockchain eDelivery protocol and will later be an integrated function of 4thtech eDelivery cross-platform client.

**Main functions--** 4thtech notarisation main functions; (1) store and timestamp a digital data or document; (2) verify the digital data or document authenticity, and; (3) access and review the notarisation details.

**Essential part--** 4thtech notarisation is an essential part of the 4thtech eDelivery ecosystem; (1) a by-product of eDelivery protocol and digital identity mechanism, and; (2) a feature of the 4thtech eDelivery cross-platform client.

**Notarisation process--** 4thtech notarisation digital data or document process; (1) creating the user account, using 4thtech wallet, and; (2) verifying the user account using FOURid which uses eIDAS and other government established verifications protocols

## 9. 4THTECH ADD-ON WALLET

**Introduction--** According to (*Cryptocurrency wallet - Wikipedia*, n.d.), a cryptocurrency wallet is a device, program or service which stores the public and/or private keys and can be used to track ownership, receive or spend cryptocurrencies. As all cryptocurrencies run on blockchains, cryptocurrency wallet can be referred also as blockchain wallets. Up to now, blockchain wallet was mostly used for cryptocurrency asset holding and exchange.

**4thtech Solution--** The *4thtech add-on* is a Google Chrome Extension wallet, that allows you to visit the distributed web of tomorrow in your browser today. It is one of our main innovations, a first system on the market capable of handling not only digital assets but also other assets such as links to encrypted electronic data and documents.

**Solution Design--** Designed and build from the ground-up, the *4thtech add-on* is fully operational and, also offers a secure identity vault, providing a user interface to manage digital identities and sign blockchain eDelivery transactions. *4thtech add-on* can be comparable to a bank account, as it contains a pair of public and private cryptographic keys. A public key allows for other wallets to execute eDelivery to the desired wallet's address, whereas a private key enables the decryption of electronic data and documents from that address.

**4thtech add-on google chrome installation--** Steps for installation; (1) follow on the link below; (2) add the extension to chrome browser; (3) now you have installed extension, you can see the icon on the right

side; (3) click on that icon and set up your wallet; (4) refresh the page and log in.

**4thtech add-on google chrome download link--**  
<https://chrome.google.com/webstore/detail/the4thpillar/npbfeeeinjddjkdmmndoojehkmhhofdk>

**Warning--** *4thtech does not hold your keys for you. We cannot access accounts, recover keys, reset passwords, nor reverse transactions. Protect your keys & always check that you are on correct URL. You are responsible for your security.*

**Quote--** “We build the 4thtech add-on from the ground-up. The challenge was to build the ADD-ON with unique blockchain document exchange feature and it took four engineers over a year to do it. I can say with certainty that the 4thtech add-on code is unique and first of its kind! “

*Denis Jazbec, 4thtech CTO*

## 10. FOUR-TOKEN

The *four-token* has been created as a 100% utility token, an atomic unit and technical component, combining three unique main features; (1) embedded TTS (i.e. token teleportation-service); (2) MTO (i.e. multiple-transfer option), and; (3) main value and “gas” in a decentralized, token-based *4thtech* ecosystem. To use the FOURdx, eDelivery service, the *four-tokens* are needed to fuel the transactions. The number of tokens is fixed, thus, there cannot be any inflation effect. As the adoption of the *4thtech* network and *four-token* transaction volume within the network grows, the demand for the *four-token* increases.

### 10.1. TOKEN SPECIFICATIONS:

*Token name: 4THPILLAR UTILITY TOKEN • Token symbol: FOUR • Blockchain: Ethereum • Maximum number of FOUR tokens issued: 400,000,000 (100%) • Decimals: 18 • Smart contact:0x4730fb1463a6f1f44aeb45f6c5c422427f37f4d0 • Unique features: teleportation service, multiple-transfer option, transaction gas • Listing: Idex, Uniswap, Hotbit, Cointiger, Lbank • Token standard: ERC-20 (latest Open Zeppelin implementation) • TGE event: Q3 2018*

## 11. HI-WIZE HARDWARE WALLET

*4thpillar technologies* have partnered with *hi-wise* project, an advanced PLUG&PLAY hardware wallet with futuristic uni-body design. Unique to the market, the *hi-wise* has no openings and buttons, just a HI definition LCD and it is powered by Qi charging technology. Accompanied by unique mobile multi-wallet with unparalleled safety features and integrated anti-spying algorithms. The *hi-wise* can be used as an alternative to *4thtech add-on*, providing service login, identification and transaction confirmation features.

## 12. TECHNOLOGY COMPONENTS

*4thtech* main technology components are; (1) blockchain with Solidity applications; (2) Laravel-PHP web framework; (3) smart contracts; (4) digital wallets; (5) decentralised database; (6) *four-token*; (7) *4thtech add-on*, and; (8) the central platform with encryption service and API interface.

### 12.1. SOLIDITY COMPATIBILITY

*4thtech* products are tested on *Kovan* network and implemented on *Ethereum* main net. Designed and build from the ground-up in Solidity the products are fully operational, compatible and ready for testing and implementation.

### 12.2. ON-BOARDING TECHNOLOGY

**Introduction--** The onboarding process starts with the login and creating a digital wallet for which a user needs a browser with a web3 provider (i.e. *4thtech add-on*).

**Solution--** Upon signing, the user is given a private key, which is unique and only known to him. Once the private key is generated, the user can sign the message which sent a request via the AJAX to the server-side platform (i.e. laravel) to validate it. Once the signature is confirmed, the user is logged in. On-boarding process also represents a bridge between organisations and individuals. In that way, it presents essential platform for future digital transformation.

**Code Sample--** Return the ETH address of the account that created the signature (user validation):

```
protected function validateSignature(Request
$req) { $msg = config('app.sign_message');

$recoveredAddress = $this->recoverSignerAddress($msg, $request->signed);

if ($request->account == $recoveredAddress) { }
return true;

$this->error = 'There is a problem with validating
your signature.'; } return false;

protected function recoverSignerAddress($msg,
$signed)

{ // ETH Message Hash

$prefix = "\x19Ethereum Signed Message:\n" .
strlen($msg); $personalMessageSha =
Keccak::hash($prefix . $msg, 256);

// Get r, s, v parameters from signature ...

// Check if is correct v value, it should be 27 or 28
...

// Recover public key ...

$publicKey = Signature::recoverPublicKey($rGmp,
$sGmp, $msgGmp, $recovery); $publicKeyString =
$publicKey['x'] . $publicKey['y'];

// Recover ETH address from public key

$recoveredAddressSha = Keccak::hash(pack('H*',
$publicKeyString), 256); $recoveredAddress =
substr($recoveredAddressSha, -40);

} return '0x' . $recoveredAddress;
```

### 12.3. SMART CONTACTS

**Introduction & Solution--** Smart contacts are essentially a code or rules written into a digital program, and were written to facilitate *4thtech* unique requirements such as; (1) saving unique ID (represent a unique id of the document); (2) deliver links (represents a link of the document); (3) represent a name (represent the name of the document), and; (4) provide a description (represents a description of the document).

**Code Sample--** A method for sending tokens to multiple users with one transaction. We gather the fee in *four-tokens* and pay in ETH:

```
function transferPreSignedMany(address _from,
address[] _tos,
uint256[] _values,
uint256 _fee,
uint256 _nonce,
uint8 _v,
bytes32 _r,
bytes32 _s) public returns (bool) {
require(_tos.length == _values.length); uint256
total = getTotal(_tos, _values, _fee);
bytes32 calcHash = calculateManyHash(_from,
_tos, _values, _fee, _nonce);
require(isValidSignature(_from, calcHash, _v, _r,
_s)); require(balances[_from] >= total);
require(!executedSettlements[_from][calcHash]);
executedSettlements[_from][calcHash] = true;
// transfer to each recipient and take fee at the end
for(uint i; i < _tos.length; i++) {
// Move tokens
balances[_from] = balances[_from].sub(_values[i]);
balances[_tos[i]] = balances[_tos[i]].add(_values[i]);
} Transfer(_from, _tos[i], _values[i]);
// Move fee
balances[_from] = balances[_from].sub(_fee);
balances[msg.sender] =
balances[msg.sender].add(_fee); Transfer(_from,
msg.sender, _fee);
TransferPreSignedMany(_from, msg.sender, total,
_fee); } return true;
```

## 12.4. BLOCKCHAIN WALLETS

**Introduction--** The *4thtech* blockchain wallet system is the base for all other platform functions. A digital wallet has both a software and information component. The software provides

security and encryption for personal information and the actual transaction.

**Solution--** Digital wallet systems enable the widespread use of digital wallet transactions among various users which gives users an easy and secure way of asset management.

## 12.5. CENTRAL PLATFORM DOCUMENT ENCRYPTION SERVICE

**Introduction--** Electronic data and documents encryption is the process by which electronic data and documents are protected with a cryptographic key (i.e. public key) so that only individuals with the corresponding decryption key (i.e. private key) can read them. When a user (i.e. an individual or an organization) wants to send documentation, he or she must first select the electronic data or document and encrypt it with the user's public key stored in a database of registered users.

**Code Sample--** (JavaScript code for document encryption):

```
const key = new NodeRSA();
const keyData = '-----BEGIN PUBLIC KEY----- ... -
-----END PUBLIC KEY-----';
key.importKey(keyData, 'pkcs8');
const reader = new FileReader();
reader.readAsArrayBuffer(input.files[0]);
let fileData = Buffer.from(reader.result);
let encrypted = key.encrypt(fileData, 'base64');
```

## 12.6. APPLICATION PROGRAMMING INTERFACE

**Introduction--** An application programming interface (API) is a set of subroutine definitions, protocols, and tools for building software. In general terms, it is a set of clearly defined methods of communication between various components.

**Solution--** The blockchain eDelivery protocol (i.e. FOURdx) API enables an easy way of integrating other systems with our infrastructure. It connects the user wallet and document repository in the process of saving and sending the encrypted electronic data and documents.

**Code Sample**-- Example of using JSON for saving documentation:

```
{ "data": [
  { "id": "D-1534156605-1",
    "wallet":
    "0x179fa0585a16016db5a82889ca9e493f543e7791",
    "link": "https://the4thpillar.com/file1",
    "name": "File 1",
  }, {"description": "Description 1"
  { "id": "D-1534156605-2",
    "wallet":
    "0x279fa0585a16016db5a82889ca9e493f543e7792",
    "link": "https://the4thpillar.com/file2",
    "name": "File 2",
  }, {"description": "Description 2"
  } "return-url": "https://sender-erp-return-url.com/returnHere"
```

## 12.7. DATABASE AND REPOSITORY

**Introduction**-- A database is an organized collection of data, stored and accessed electronically. The blockchain eDelivery protocol (i.e. FOURdx) Database contains all the user information gathered from the KYC processes, settings and other valuable information. It represents a collection of data needed to perform the exchanges stored safely and securely.

**Solution**-- A data repository refers to an enterprise data storage entity into which data has been partitioned. Due to the current legislation, we keep two repositories a sender as well as a receiver repository. Once a user sends a document, it is redirected to the blockchain eDelivery protocol (i.e. FOURdx) repository, where it is duplicated and safely stored. This enables the management of send electronic data and documents without disrupting the other parties viewing.

## 13. 4THPILLAR TECHNOLOGIES REVENUE MODEL

**Introduction**-- According to *The Best Blockchain Business Models | Blockchain Council*, n.d., blockchain has grabbed the attention of a majority of the industrial verticals out there. Not only is it transforming the way a business functions, but it is also enabling innovation at a rapid pace. More and more companies are increasingly adopting blockchain for their businesses as blockchain is one technology which makes it more feasible for mainstream implementation. So far *4thpillar technologies* offer four revenue models, which will form the economic company future.

**Revenue Model One**-- Based on the chosen subscription plan and selected blockchain network, the user will be charged for electronic data and documents transactions. In the case of *Hashnet* blockchain, the transaction fee is used for "gas" to fuel the transactions, so the *Hashnet* and *4thpillar technologies* revenue will come from charging transaction "gas" fees. The case is similar for *Ethereum* blockchain, where a fee is also used for transaction "gas", charged by the Ethereum network. In this case, *4thpillar technologies* revenue will come from charged added value. Other transaction fee models will follow, as the project develops.

**Revenue Model Two**-- Using *4thpillar technologies* specific modules (i.e. central platform, electronic data and documents repository, encryption service, APIs, *blockchain eDelivery protocol*, desktop or mobile client), to construct a white-label solution. In this case, revenues are generated from the IP rights income.

**Revenue Model Three**-- In the case of *4thpillar technologies* eDelivery solution adoption by other Solidity based blockchain networks, revenues are generated from the hybrid income, shared between IP rights and transaction fee collected.

**Revenue Model Four**-- Based on the chosen subscription plan, the user will be charged for electronic data and documents repository, hosted by *4thpillar technologies*. In this case, revenues are created from electronic data and documents repository payment plans.



## 14. VARIOUS BLOCKCHAIN CONNECTION OPTION

**Ethereum--** As different blockchains are built to serve specific purpose and industry, an option of choice is a must. The *4thtech* products natively work on *Ethereum* blockchain and its fork versions. According to *What is Ethereum? | Ethereum.org*, n.d., the Ethereum community is the largest and most active blockchain community in the world. It includes core protocol developers, crypto-economic researchers, mining organizations, ETH holders, app developers, ordinary users, fortune 500 companies, and, as of 2018 also *4thtech* products.

**Si-Chain--** The second *4thtech* product implementation is currently underway on the Slovenian National Blockchain Testing Infrastructure called SI-Chain, which will enable testing of existing and new blockchain applications for the public and private sector. SI-Chain was established by the innovative technology provider company Hashnet in cooperation with Telemach, the telecommunication solutions provider, in November 2019 (*Slovenia launches national test blockchain infrastructure and Slovenian Blockchain partnership | GOV.SI*, n.d.). HashNet is an innovative consensus platform which provides a novel solution to computational and communicational difficulties of maintaining large-size public distributed ledgers. (*Tolar - Next-gen cryptocurrency*, n.d.)

**Other--** New *blockchain eDelivery protocol* (i.e. FOURdx) implementations will follow according to product development and recognition.

## 15. INDUSTRY AND BUSINESS APPLICATIONS

**Introduction--** The *4thpillar technologies* products and services can be applied to various industries, as the need for secure digital eDelivery of sensitive electronic data and documents rises.

**Public Sector--**According to CEF (i.e. Connectin Europe Facility), eDelivery helps public administrations to exchange electronic data and documents with other public administrations, businesses and citizens, in an interoperable,

secure, reliable and trusted way. Blockchain eDelivery has significant advantages, comparing to traditional eDelivery. It 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.

**Private Sector--** Blockchain eDelivery can enable the exchange of value-holding documentation, such as proforma invoice, commercial invoice, certificates of origin, bills of lading, bank drafts, seaway bills, and other types of transport and shipping documentation.

**Shipping Use Case--** A blockchain initiative for seaborne cargo is a good example of blockchain adoption, aimed at cutting costs and improving cargo tracking. For ocean cargo carriers, blockchain technology allows participants to share information as goods move through maritime focused supply chains, explained (Paris, 2019) from the Wall Street Journal.

**Technology Recommendation--** According to (*Blockchain – Perspectives, Insights, and Analysis | Deloitte US*, n.d.), blockchain technology has the potential to transform health care, placing the patient at the centre of the health care ecosystem and increasing the security, privacy, and interoperability of health data.

**Technology Recommendation--** According to (*Insurance Disruption Using Blockchain Tech | CB Insights*, n.d.), there are four major blockchain applications to insurance industry; (1) fraud detection (immutable ledger can help eliminate common sources of fraud); (2) property (shared ledger and insurance policies executed through smart contracts can bring order to property insurance); (3) health insurance (medical records can be cryptographically secured), and;(4) reinsurance (simplify the flow of information and payments)

## 16. LEGAL

**Personal data Protection--** We are firmly committed to protecting collected and processed personal data and designing our platform in compliance with the individual's data privacy,

which will be protected at the highest level. We have already carried out the legal analysis of the 4th Pillar habitat for personal data protection issues with the help of external legal service providers to ensure that what we pursue is feasible. We will make sure that all processes of individual's data will be audited and acquire certifications of our conduct, procedures and security measures regarding personal data by respective certification authorities under the EU General Data Protection Regulation. The individuals will be able to choose a level of privacy according to their needs and desires on the 4th Pillar platform. They will also be able to withdraw their data. The blockchain eDelivery protocol (i.e. FOURdx) does not store the transmitted electronic data and documents on the blockchain. The electronic data and documents are stored off-chain. The protocol records links to encrypted files and hashes of the encrypted content on the blockchain. This safeguards the rights of individuals to confidentiality and privacy. This safeguards the rights of individuals to confidentiality and privacy.

#### 16.1. LEGISLATION AND REGULATION IMPACT

**Introduction--** According to the article *Regulating emerging technology* | *Deloitte Insights*, n.d.), regulatory leaders are faced with a key challenge: how to best protect citizens, ensure fair markets, and enforce regulations, while allowing new technologies and businesses to flourish? In this time, companies and organisations are already using different centralised systems for exchanging and storing sensitive personal electronic documentation within the organisation as well as between the organisation and individuals.

**Legal Impact--** As the use of blockchain technology will start to emerge, so will the need for a legal framework. The European Commission is currently working on the legal framework for smart contracts enforceability, along with solving the question of issuing and trading tokens (i.e. crypto assets), when they are not considered as financial instruments. (*Blockchain Technologies* | *Shaping Europe's digital future*, n.d.)

#### 16.2. REGULATORY AND RISK MIGRATION

**Four-Token--** The sale of the *four-tokens* is available on the designated exchange and it is not a public offering of equity or debt and, consequently, does not fall under securities or any prospectus regulation. The *four-tokens* are not securities as defined under applicable laws of Europe Union. Therefore, the *four-tokens* have not been registered with any competent regulator. The exchange sale of the *four-tokens* is unregulated. We are closely following changes to legislation in the most relevant jurisdictions in the world and undertake to act accordingly if regulatory changes impact the *four-token* exchange sale and operations of the *4th pillar technologies* infrastructure. We are not a financial institution and are currently not under the supervision of any financial supervisory authority. We do not provide any licensed financial services, such as investment or brokerage services, capital raising, fund management or investment advice. The sale of the *four-tokens* was in respect of distance contracts excluded from the right of withdrawal since it concerns the supply of goods for which the price is dependent on fluctuations in the market which cannot be controlled by us and which may occur within the withdrawal period and since it concerns the supply of digital content on a non-tangible medium. This means that the contributors don't have the right to a cooling-off period. We guarantee that the best efforts are made to comply with all our tax obligations, which apply to the Europe Union. The contributors shall determine what, if any, taxes apply to their participation in the sale of *four-tokens* (i.e., sale, use, value-added, and similar taxes). The contributors shall withhold, collect, report and remit the correct taxes to the appropriate tax authority, while all of their factual and potential tax obligations are of their concern and responsibility.

#### 16.3. BLOCKCHAIN AND GDPR

**Introduction--** Sending personal data through the blockchain presents quite a big GDPR challenge. GDPR demands responsibility for ensuring compliance, what can become demanding, especially in the permissionless public blockchain network. GDPR allows personal data processing

only in the case of explicit authorisation by the subject. GDPR also invokes the right of data erasure, which can be especially tricky when dealing with blockchain-ledger. (*EUR-Lex - 32016R0679 - EN - EUR-Lex*, n.d.)

**4thtech Solution--** *Blockchain eDelivery protocol* (i.e. FOURdx) was designed and built according to the European Union and GDPR guidelines with main GDPR compliance features; (1) blockchain network is used for transactions that include encrypted document link, that only the receiver can open using his or her private key; (2) no personal information is located in the blockchain transaction; (3) send encrypted electronic data and documents are stored in the off-chain data repository (i.e. data repository of user choice) and can be erased on the subject request, and; (4) the sender and the receiver jointly assume responsibility for complying with the GDPR and establishing a lawful basis.

**Explainer--** According to Fridgen Nikolas Guggenberger Thomas Hoeren Wolfgang Prinz Nils Urbach Johannes Baur et al., n.d., this GDPR-blockchain solution falls under “pseudonymization” approach in which, data on the blockchain is pseudonymized so that it only qualifies as personal data in relation to those participants who possess certain additional information that allows attribution of the data to a natural person.

## 17. FUTHER DEVELOPMENT

**Poc--** After two years of use-cases MVP (i.e. minimum viable product) testing, the technical feasibility and its practical potential have been proven, with that PoC (i.e. proof of concept) was confirmed. With further development, 4thtech use-cases will be merged into a cross-platform desktop and mobile client and provide the technology for further wider adoption.

**Technical Paper--** The development of *blockchain eDelivery* (i.e. FOURdx) cross-platform (i.e. Windows, Mac OS, Linux, Android, iOS) desktop and mobile client is specified in the *blockchain e-delivery cross-platform client proposal technical paper*:

<https://www.the4thpillar.io/documents/4thpillar-technologies-desktop-mobile-client.pdf>

## 18. TEAM

Meet the team behind *4thpillar technologies*. “In the process of development, we have mastered our areas of expertise and designed unique services, which we can offer to the world.”

TALI REZUN, FOUNDING COUNCIL CHAIN  
*Doctor of Business Administration, DBA Master of Business Administration, EMBA*

started his entrepreneurial career at the age of 18 and grew his business organically until this day. Under the domain of Cotrugli Business School, Tali finished his EMBA and later in 2018 his Business Doctorate (i.e. DBA, specializing in online technology. Dr. Rezun specializes in online brand awareness, web application development and blockchain technology. He enjoys the title of lecturer, advisor and UN/CEFACT expert. Current, Dr. Rezun acts as group CEO in *Lighthouse holding Ltd.* and holds procurement in *4thpillar technologies Ltd.*, publishes articles associated with his expertise, serves as projects consultant and appears as a guest speaker to the media.

- 2017 – present Crypto & DLT/blockchain Lecturer at Cotrugli Business School
- 2011 – 2017 Executive Manager at Naton HR
- 2000 - 2011 Senior HR recruiter and advisor at NATON HR
- 2000 – 2011 Founder and Executive Manager of TDS Group
- 2018 - “Leader Beyond” award by Beyond 4.0
- 2020 - UN/CEFACT blockchain expert.

DUSAN LAZAR, FOUNDING COUNCIL MEMBER,  
*Master of Business Administration, MBA*

Dusan has over 25 years of experience in various industry businesses as a CFO, CEO and HR recruiter. He has successfully created, helped, consulted and led many start-ups as well as corporations. He is the co-founder of Naton HR and Work Service, one of the largest HR agencies in Europe.

- 2011 – 2017 Executive Manager at Naton & Work Service, HR
- 2000 - 2011 Senior HR recruiter and advisor at NATON HR
- 2000 – 2011 CEO, Arenda Real Estate, Slovenia
- 1995 – 2000 CEO, Kresto International, Austria

#### Licenses & Accomplishments

- 2017 Currency Exchange Operations (The Bank Association of Slovenia)
- 2013 Management & Representation of HR Agencies – licence (Slovenian Ministry of Labor)
- 2013 Government license - Tax advisor: License D 0052
- 2005 Real Estate Agency license (Slovenian Ministry of Environment and Spatial Planning): License 00347
- 2002 Insurance Agency License (Slovenian Insurance Association): License 1184
- 1997 – 2001 Member of the Supervisory Board of the Slovenian Chamber of Commerce – GZS UO LJ
- 1998 Cochran Fellowship Program - Certificate of Achievement: United States Department of Agriculture.

ROMAN DOBRINA, FOUNDING COUNCIL MEMBER,  
*Bachelor of Arts, BA*

Roman started his professional career as a Finance Manager in GlaxoSmithKline and continued as General Manager for the Adriatic region and Marketing Director for Aquafresh Central Eastern Europe. Since then, he has been working in the pharmaceutical industry with a broad experience in sales, marketing, finance, and general management. Currently, he is a shareholder in a healthcare company and owns an HR agency. In the *4thpillar technologies*, he is the Chief Financial Officer (CFO) and is responsible for budgeting, forecasting, reporting and other financial matters regarding the project.

#### Licenses & Accomplishments

- 2014 – 2017 CFO at Naton HR
- 2009 - 2014 Adriatic BST Group
- 1997 – 2009 GlaxoSmithKline
- 2017 Currency Exchange Operations (The Bank Association of Slovenia)
- Rewarded “Top 20” Young Executives title in Europe
- Member of GSK

- President Exchange Days for talented leaders
- Member of Super Brands Slovenia Board

JAKA GORNIK, FOUNDING COUNCIL MEMBER,

Jaka began his professional career in marketing 25 years ago. He was responsible for out-of-the-box solutions for many international corporation's active in the Adriatic region. His passion has brought him to crossroads where he can merge his marketing skills with blockchain solutions. In the *4thpillar technologies*, he is the Chief Marketing Officer (CMO) and is responsible for the marketing strategy and managing marketing activities and business development of the project.

MIHA BOZIC, FOUNDING COUNCIL MEMBER

Miha is an economist, who started his blockchain involvement already in 2013. Since then, he is keen on finding out everything possible concerning blockchain developments and is one of the pioneers of blockchain investments in the Adriatic region. In the *4thpillar technologies*, he is managing, strategic, financial and reputational security risk strategies.

DENIS JAZBEC, CTO

Denis Jazbec is a software engineer with more a decade of experience and a computer science degree. For the past 3 years, he has been researching blockchain eDelivery protocols and their integration into existing IT systems. He is highly proficient in PHP, JS and MySQL. His focus remains set on quality and secure, fast final products. In the *4thpillar technologies*, he holds the title of chief technology officer. Currently, Denis works on a blockchain eDelivery cross-platform development.

#### Licenses & Accomplishments

- 2016 Engineering Degree from Faculty of Electrical Engineering and Computer Science, Ljubljana, Slovenia
- Silver award at the ACM Competition in Computer Science (national level)
- Made several connections for Magento with payment & accounting systems
- Worked on

projects for larger online shops on the German-speaking market

#### ANTON DOBRINA, LEGISLATION SPECIALIST

Anton has over 15 years of experience in the field of both national and international pension insurance law. He also has exceptional experience and practical skills in media communication and various forms of communication with various audiences. He actively works on resolving European legislation issues concerning the *4thpillar technologies*.

- 2000 – present Head of Research and Development Department at the Slovenian Pension Fund (SPIZ)
- 2010 – present EESSI Team Member at Electronic Exchange of Social Security Information

#### Licenses & Accomplishments

2002 EU Social Security Labor Training Academy, Netherlands

#### ANDREJ GORENJAK, IT DEVELOPER

Andrej holds a computer science degree and specializes in web development. He is a full-stack developer with high knowledge of PHP, JS, MySQL and Apache. With over 10 years of experience, Andrej is a highly valuable member of blockchain eDelivery platform development team. In the *4thpillar technologies*, he is an IT Developer and is responsible for programming the KYC and KYC form for the eDelivery platform, as well as general supervision of platform construction.

#### MARTA PILCH, PROJECT COORDINATOR

Marta holds a double MA degree in law and international relations and has international experience in the fields of finance and HR. She is a former management board assistant and has a well-rounded skill set, including speaking 4 languages, which is why she is coordinating the *4thpillar technologies* and responsible for legal and administrative support.

#### Licenses & Accomplishments

- Participated in the corporate transition of activities at Heineken, Edinburgh
- Completed intensive training in work organization (including Kaizen), Customer Service & Order to Cash Management

#### SILVO FORTUNA, TEAM SUPPORT

Silvo has a history in media and the music industry. He is using his influence and passion for blockchain to make promising projects come alive. His regional popularity as a musician has led to a strong social media presence that will fully be utilized in the *4thpillar technologies* marketing process. He is supporting the *4thpillar technologies* team on many levels, mostly with social media administration, such as on our Telegram channel.

#### Licenses & Accomplishments

One of the main forces behind the big explosion of Slovenian electronic dance scene in the 90s

- Mixed and released over 50 compilation albums
- Collaborated with prominent music stars in the region
- House music producer with over 30 released songs on respected music labels

#### NIKOLA BUBAN, MARKETING & COMMUNICATIONS ADVISOR

Nikola is an entrepreneurial and results-driven executive with a proven track record of accelerated growth in an integrated range of communication services to national and multinational clients across CEE. He has 20+ years of experience working in various countries for the largest global communications company – WPP Plc. He works on global marketing & communication strategies for the *4thpillar technologies*.

#### DUSKO PAVASOVIC, CRYPTO ANALYTICS ADVISOR

Dusko is a renowned chess Grandmaster and was among the top 100 players in the world. Pursuing new challenges, he was a Localization Manager for Slovenia at PokerStars and later a Localization Team Leader for Eastern Europe. His transition from a chess professional to a high-stakes poker

pro was seamless. He is currently fully engaged in crypto and analysing, investing and advising in several ICOs. His Grandmaster strategic skills are guiding the *4thpillar technologies* in the right direction.

#### Licenses & Accomplishments

- Chess Grandmaster since 1999
- Qualified twice for the Chess World Cup
- President of the Ljubljana Chess Club
- High Stakes poker player, poker coach, co-founder of Chess Raiders d.o.o.
- Co-author of Chess - From Beginner to Grandmaster

#### DRAZEN KAPUSTA, DLT/BLOCKCHAIN & BUSINESS ADVISOR

Dražen is the Principal of Tolar.io, open-source, community governed crypto-currency featuring scalable, fast, secure, and fair transactions. He is also the founder of the biggest DLT/blockchain conference in the region, DLT/blockchain Adria, covering Slovenia, Croatia, Serbia and Bulgaria. Drazen is successfully guiding the 4th Pillar Team through the quickly changing crypto & DLT/blockchain world.

#### MITJA CERNE, FIAT & CRYPTO TAX ADVISOR

Mitja joined the world of taxes in 2004. For the last 8 years, he has been a Partner and Head of the Tax at BDO Slovenia. He is leading a team of 9 fully-fledged tax advisors specialized in different tax areas. Mitja's area of expertise is corporate income tax, international tax and transfer pricing. Recently, due to his clients' needs, Mitja expanded his tax knowledge by adopting the specifics of blockchain and is now a blockchain tax expert. He is a tax advisor for the *4thpillar technologies*, making sure that our project and platform is fully taxed compliant.

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