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Tokenization used for 4thTech Service Value FEE Monetization

[Light paper by Dr. Tali Rezun]

Blockchain technology enables an alternative incentive mechanism through FEE tokenization.[1] Tokenization addresses the weaknesses such as cybersecurity and disintermediation while enabling advantages such as; (1) 24/7 borderless access; (2); the speed of execution (3) lower transaction (i.e., TX) cost; (5) scalability, and; (6) transparency. As the cost of developing experimental blockchain technology projects is higher, a clear revenue model strategy is crucial. *4thTech* creates value by connecting electronic data senders and recipients into a marketplace, enabling them to exchange sensitive data in the form of metadata, data files and instant messages from wallet to wallet using secure decentralized public blockchains. This value is monetized with the help of FEE tokenization.

Dr. Tali Režun, head of 4thTech initiative

Keywords: web3, tokenization, 4thTech, fourdx, fourid, fourns, fourim, four token, internet, digital transformation, blockchain technology, decentralization, peer-to-peer, online trust, online security, online privacy, DLT, Ethereum, Polkadot, Edgeware, Tolar HashNet, Solana blockchain

1. INTRODUCTION

According to Cryptopedia, tokens are assets that allow information and value to be transferred, stored, and verified in a decentralized manner. These crypto tokens can take many forms and can be programmed with unique characteristics that expand their use cases.[2] Because *4thTech* protocols are deployed on several blockchains, several tokens are used in the ecosystem. System native FOUR token is used to enable discounts, services access and incentivize participants. FOUR tokens represent a unit of value within the *Application Layer* enabling the *Right to Stake* and *Right to Access* while the tokens such as ETH, TOL, EDG or SOL are used to settle the underlying Layer 1 blockchain transaction (i.e., TX) cost.

4thTech creates value by connecting electronic data senders and recipients into a marketplace, enabling them to exchange sensitive data in the form of metadata, data files and instant messages from wallet address A to wallet address B securely. To monetize created value, a tokenization FEE revenue model was designed that sets rules of engagement.

**__Note;__ A revenue model is a concept of strategies implemented by a project to create a profit, by providing a product or a service, while a token model defines the purpose of the token and its utility as a fundamental part of the tokenized revenue model.[3] The top three valuable variables a token must have are features, proper role, and purpose.[4]*

The *4thTech* tokenization FEE revenue model serves as a tool to specify main aspects of FOUR token economies; (1) token attributes and specification; (2) token purpose and utility, and; (3) model economics.

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[1] https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/risk/deloitte-nl-risk-tokenization-paper-final.pdf [accessed 22 January 2021]
[2] https://www.gemini.com/cryptopedia/what-is-tokenization-definition-crypto-token#section-security-tokens-utility-tokens-and-cryptocurrencies [accessed 15 December 2020]
[3] https://link.medium.com/5yBf3bJuVcb [accessed 10 January 2021]
[4] https://www.blockchain-council.org/blockchain/the-best-blockchain-business-models/ [accessed 18 January 2021]

2. INTRO TO 4THTECH

In 2017, *4thTech* proposed and later developed a set of fully working solutions, which leverage trust provided by the blockchain to enable secure, immutable; (1) *digital identity protocol* (i.e., FOURid) that connects blockchain wallets when data is exchanged and serves as the public key exchange point between users; (2) *data exchange* (i.e., FOURdx) that provides a secure, immutable wallet A to wallet B (i.e., FOURwaL) data file and metadata exchange; (3) *digital data verification* (i.e., FOURns), that provides unique digital data timestamp and file checksum authenticity verification, and; (4) Layer 1 *instant messaging protocol* (i.e., FOURim), that enables real-time on-chain chat using Solana blockchain.

After two years of *4thTech MVP* (i.e., minimum viable product) testing and refinement, the technical feasibility and its practical potential have been proven, with that PoC (i.e., proof of concept) was confirmed. Moving to version 2.0, *4thTech* enters the adoption phase and becomes globally interoperable, accessible to all and ready to use.

**Note;* *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.* [5]

2. FOUNDATION

In April 2021, *4thTech* launched the *Web Platform 2.0* and *Wallet 2.0* (i.e., FOURwaL) and with that enabled further ecosystem development. The *4thTech Web Platform 2.0* codebase has been rewritten with *TypeScript*, a superset of JavaScript that supports a type system and compiles to plain JavaScript. The platform has also overgone the crucial upgrade from Vue 2 to *Vue 3*, which is much more performant. Under the hood, *Vue 3* is completely rewritten with TypeScript.

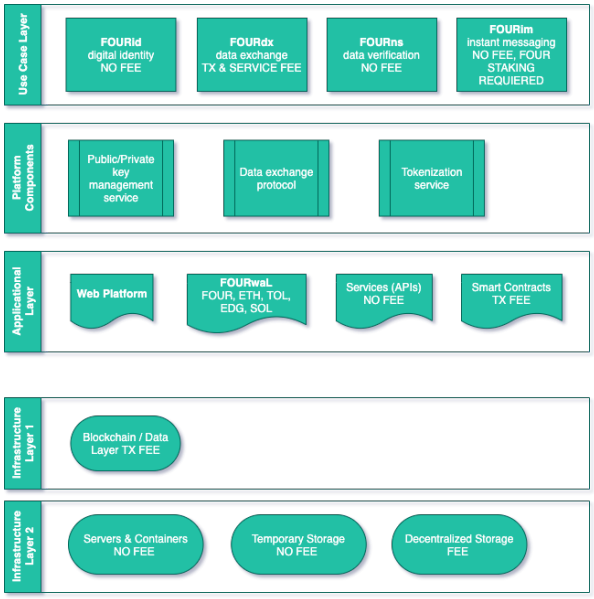
**Note;* *Vue is a progressive framework for building user interfaces. Unlike other monolithic frameworks, Vue is designed from the ground up to be incrementally adoptable. The core library is focused on the view layer only and is easy to pick up and integrate with other libraries or existing projects.* [6]

Multi-blockchain support enables transaction cost and speed choice, which is especially important when dealing with public blockchains. Next, to already supported Ethereum, two additional blockchains were already added; HashNet and Polkadot Substrate Edgeware, both chosen based on their uniqueness. Due to extreme transaction speed, Solana comes as the fourth supported blockchain and will serve as the blockchain of choice enabling the *instant messaging protocol* (i.e., FOURim) and *digital data exchange* (i.e., FOURdx). Special logic was added into the programming of the *4thTech Web Platform 2.0*, which enables us to add additional blockchain support when needed. [7]

3. 4THTECH ECOSYSTEM FEEs DEFINED BY LAYER INFRASTRUCTURE

To fully comprehend the *4thTech* multi-blockchain ecosystem, FEEs and costs were divided by layer infrastructure; (1) USE CASE LAYER defines *4thTech* solutions with FEE specification (i.e., FOURid-NO FEE, FOURdx–TX&SERVICE FEE, FOURns–NO FEE, FOURim–NO FEE but FOUR Tier 3 STAKING REQUIERED); (2) the second layer defines the PLATFORM COMPONENTS (i.e., PUBLIC/PRIVATE KEY MANAGEMENT SERVICE, DATA EXCHANGE PROTOCOL, TOKENIZATION SERVICE; (3) the third layer defines the APPLICATIONS (i.e., WEB PLATFORM-NO FEE, FOURwaL-NO FEE, API SERVICES-NO FEE, SMART CONTRACTS-TX FEE), and; (4) INFRASTRUCTURAL LAYERs are defining capabilities and connectivity's to blockchain networks, hardware and storage (i.e., BLOCKCHAIN–TX cost, SERVER–NO FEE, TEPORARY STORAGE–NO FEE, DECENTRALIZED STORAGE–STORAGE FEE (i.e., storage fee will be defined in the later stage when this option will be available).

[5] http://adriatic-council.eu/beyond-4-0-ljubljana-2018/ [accessed 10 May 2021]
[6] https://v3.vuejs.org/guide/introduction.html [accessed 20 May 2021]
[7] https://github.com/4thtech/static-assets/raw/main/pdf/whitepaper.pdf [accessed 5 May 2021]



4. SOLUTION COMPONENTS

The *4thTech* solution (i.e., FOURid, FOURdx, FOURns and FOURim) main components are; (1) *4thTech Chromium*[8] *and Firefox*[9] *add-on wallet* (i.e., FOURwaL) with multi-blockchain support (i.e., FOUR, ETH, EDG, SOL, TOL) ; (2) *digital identity protocol* (i.e., FOURid) which serves as a public key exchange point between both users; (3) *4thTech User Client Web Platform*[10] which enables users with blockchain digital data file exchange (i.e., FOURdx), data verification protocol (i.e., FOURns) and instant messaging service (i.e., FOURim); (4) *FOUR token*[11], a multi-blockchain asset that as a locked (staked) asset acts as an enabler activating the instant messaging feature and data exchange FOURdx transaction FEE discounts inside the *4thTech* Web Platform.

5. WALLET *(i.e., FOURwaL)*

With a single purpose, *FOURwaL* serves as a blockchain gateway, a tool for *4thTech* services access. It provides the simplest but secure way to connect via Firefox and Chromium-based browsers to the *4thTech* blockchain applications (i.e., FOURid, FOURdx, FOURns and FOURim) as it contains a pair of public and private cryptographic keys. A public key allows for other wallets to execute *4thTech* services to the desired wallet's address, whereas a private key enables the decryption of exchanged metadata, data files and instant messages.[12]

**Note;* *According to Wiki, 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.*[13]

**Quote;* *"We build the 4thTech add-on from the ground-up. The challenge was to build the ADD-ON with a 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 the first of its kind! "*

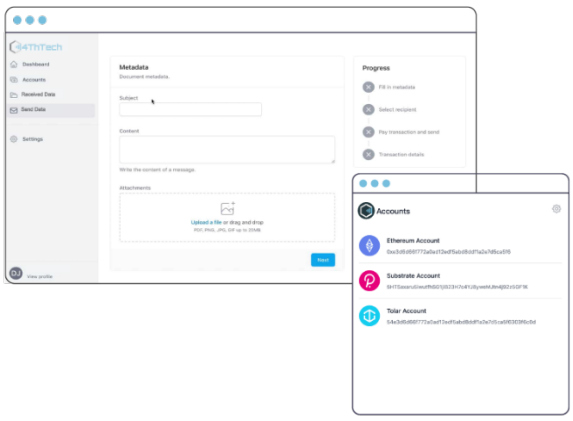
Denis Jazbec, 4thTech CTO

6. WEB PLATFORM CLIENT

The *4thTech web platform client* serves as an onboarding HUB accessed by the user via a Google Chrome or Mozilla Firefox web browser with an installed FOURwaL blockchain wallet add-on. It connects and hosts all the deployed 4thTech protocols and services in one ecosystem, giving the user all in one access.

The platform combines several services and solutions; (1) *blockchain digital identity protocol* or short FOURid (status: active); (2) *digital data exchange* or short FOURdx (status: active); (3) *digital data verification* service or short FOURns (status: active); (4) *digital data file encryption service* (status: active); (5) *temporary off-chain database and repository* (status: active); (6) *JSON metadata schema* (status: active); (7) *transaction fee mechanism* (status: active), and; (8) *Solana blockchain instant messaging service* or short FOURim (status: in development).

[8] https://chrome.google.com/webstore/detail/fourwal-4thtech-wallet/ahcefhodjjnpmeeaghfhocjiicghdcbn?hl=sl&authuser=5 [accessed 20 May 2021]
[9] https://addons.mozilla.org/sl/firefox/addon/fourwal-4thtech-wallet/ [accessed 20 May 2021]
[10] https://app.4thtech.io/ [accessed 20 May 2021]
[11] https://wiki.4thtech.io/intro/token.html [accessed 18 May 2021]
[12] https://wiki.4thtech.io/intro/discover.html#fourwal-4thtech-multi-chain-client-app-wallet [accessed 20 May 2021]
[13] https://en.wikipedia.org/wiki/Cryptocurrency_wallet [accessed 20 May 2021]



***Note;** The web platform 2.0 re-design brings a modern minimalistic design style that emphasises simplicity with simple yet effective navigation and application system. Light white colours predominate the interface, inspiring the users with simplicity and reassurance while executing complicated transactions in the background*

7. SMART CONTRACTS & TRANSACTION COST (i.e., SC TX COST)

Smart contacts are essentially code or rules written into a digital program and were written to facilitate *4thTech* unique requirements. In the case of FOURdx (i.e., data exchange protocol), a smart contract executes the following; (1) saving link of JSON metadata file, and; (2) saving checksum of JSON metadata file. Following the SC execution on the blockchain of the users choice (i.e., Ethereum, Polkadot Edgeware, Tolar HashNet, Solana), the SC transaction cost is determined by the opt blockchain network.

In the case of FOURim (i.e., instant messaging protocol), a smart contract executes the following; (1) saving instant messages from the sender; (2) retrieving instant messages from receivers. The SC transaction cost is determined by the Solana blockchain network.

In the case of FOUR Staking a smart contract executes the following; (1) transferring tokens from sender to contract address; (2) creating lock schedule metadata with locking details (i.e., token amount, lock period, transaction cost discount, etc); (3) enable the transfer of tokens from contract to sender address once lock period is over. As FOUR is an ERC-20 token, an Ethereum SC transaction is executed accompanied by Ethereum TX cost.

8. DATA REPOSITORY, STORAGE & FEEs

A database is an organized collection of data, stored and accessed electronically. The *4thTech* system currently contains three databases; (1) *MySQL database*: storing user encrypted info, platform settings, user wallets, RSA public key for data encryption. MySQL database is protected with a firewall. Data exchanges are protected with an HTTPS connection. In the case of a user request, it is possible to delete any user-related data: (2) *local or cloud file repository*: storing encrypted electronic data files. In the case of a user request, it is possible to delete any user-related data; (3) *blockchain*: encrypted message and timestamp of the send an instant message. A decentralized cloud storage option will be later added.

***Note;** The 4thTech protocols does not store any personal data on the blockchain. The data is stored off-chain. The protocol records links to encrypted files and hashes of the encrypted content on the blockchain. The hashing of exchange data enables the GDPR compliance, for example, if there were a request to delete some data files, the network controller would be able to delete the requested data from off-chain storage, leaving what would then become an empty hash on-chain.*

4thTech currently does not charge for temporary 7-day storage of the exchanged data files. A decentralized storage option is in the development pipeline. The goal is to enable different storage options, so the user would have a choice, for example; (1) to opt for a GDPR compliant centralized cloud storage, or; (2) to opt for a decentralized storage option of their choice. Storage FEEs will be added in the later project stages.

***Note;** The current data exchange file size is limited to 20MB. All exchanged files are deleted after 7 days so please do not forget to download the files upon exchange.*

9. FOUR TOKEN

Developed and deployed in 2018, FOUR acted as one of the technical components needed for the *4thTech* ecosystem tokenization on Ethereum network, combining three technical utility features; (1) embedded TTS interface (i.e., token teleportation-service); (2) MTO (i.e., multiple-transfer option); (3) GAS feature.

Due to Ethereum gas prices increase, the ERC-20 FOUR had to evolve to become a multiverse asset occupying the space of multi-chains, while being used as the primary means to enable *4thTech* services, services discounts, incentivize participants and provide a default mechanism to store and exchange value.

Cross-chain interoperability of ERC-20 FOUR with other blockchains essentially increases the decentralisation of liquidity and unlocks a universe of possibilities for further development. The users instantly benefit from lower fees and the native DeFi economy of the bridged blockchain. With an unchanged total and circulating token supply, the FOUR ERC-20 exists on its native Ethereum blockchain, while a wrapped synthetic version exists on the bridged blockchains such as Binance Smart Chain and Solana. The ERC-20 FOUR original is used for Staking.

Specifications;
*Ethereum / ERC-20 FOUR
*Token name: The 4th Pillar Token
*Token symbol: FOUR
*Smart contact: 0x4730fb1463a6f1f44aeb45f6c5c422427f37f4d0
*Decimals: 18
*Blockchain explorer: https://etherscan.io/token/0x4730fb1463a6f1f44aeb45f6c5c422427f37f4d0
*Utility: TTS, MTO, GAS, right to stake, right to access

Four token economy;
The *4thTech* economy utilizes FOUR as a unit of value on the web platform that enables token holders with the right to access applications and earn services discounts by staking FOUR in the ecosystem.

Four token utility;
4thTech token (i.e., FOUR) is the ecosystem native utility token, used as the primary means to enable services, incentivize participants. It represents a unit of value with the right to stake and access to services discounts while enabling ecosystem tokenization.

10. REVENUE MODELS

To address the complexity of *4thTech* monetization, two revenue models were created;

(1) the subscription revenue model was designed based on the current conventional corporate online data exchange solution pricing and early adopters experience surveys. Based on the private permissionless blockchain it is most suitable for regulated users from the private and public sector and civil society, and;

(2) the transaction revenue model is based on the network transaction (i.e., pay per transaction). Based on the public blockchains, it is most suitable for users that have the necessity for traceability of executed transactions.

Both models are viable, as users are coming from two completely different groups. The trade-off is between low-cost private-chains with no open transaction traceability and public-chains with potential volatility and in most cases higher prices but publicly traceable transactions.

Private-chain subscription-based revenue model;
Based on the chosen monthly subscription plan, the user will be charged for electronic data exchange transactions. *4thTech* service revenue is calculated in the subscription plan.

Subscription plan example;
*SME Subscription Plan: 1000 to 5000 TX with monthly fix FIAT price
*Corporate Subscription Plan 2: 5000 to 10.000 TX with monthly fix FIAT price
*Enterprise Subscription Plan 3: 10.000 to 50.000 TX with monthly fix FIAT price
* Custom Subscription Plan 4: 1.000.000+ TX with monthly fix FIAT price

Specifications;
*Network: HashNet, Ethereum Forked Chain, Substrate
*Network type: private blockchain
*Speed: 50.000 TPS (tested on HashNet)

Benefits;
*Fixed price, no volatility
*Fixed speed and performance
*Permissioned

***Note;** Storage cost is currently not included.*

Public-chain transaction-based revenue model;
Transaction cost will appear when exchanging data from wallet to wallet (i.e., FOURdx). As

FOURdx is multi-blockchain interoperable (i.e., Ethereum, Tolar HashNet, Polkadot Edgeware, Solana), several options are available. For example, if the user opts for the Ethereum chain, the cost will be settled in ETH, if the user chooses Edgeware, the TX cost will be settled in EDG. FOURdx TX cost is based on two factors; (1) blockchain network TX cost (varies from 0.0025$ to X), and; (2) added *4thTech* service FEE margin (e.g., 5$).

The FOURim (i.e., instant messaging) transaction cost is for now solely based on the Solana blockchain network transaction cost and has no additional service FEE margin. One TX is needed to store the encrypted instant message to the smart contract. Tier 3 Staking of FOUR tokens unlocks the FOURim service. The users will be able to unlock/enable the instant wallet to wallet messaging service by Tier 3 staking the FOUR tokens on the *4thTech* Web Platform. No FOUR tokens are spent to activate the service.

(1) Public-blockchain network TX cost is based on two TX needed to execute data exchange (i.e., FOURdx). The first TX saves the link to the metadata file and checksum of the metadata file to the SC as the second TX sends the transaction fee in the native token (i.e. ETH, EDG, TOL, SOL) to the solution FEE taker address.

(2) *4thTech* services FEE margins are defined in FIAT but converted in ETH, EGD, TOL, SOL or FOUR based on the market exchange rate.

***Note;** TX cost depends on the public blockchain network selected.*

FEE&Cost calculation overview (applicable to all chains);
*First SC TX + Second TX = Total blockchain network TX cost
*SC TX cost + *4thTech* service FEE surcharge = Total user cost

Explainers (Ethereum Use Case);
*GAS_UNITS: The amount needed to execute blockchain TX for *4thTech* wallet to wallet data exchange (i.e., FOURdx)
*GAS_PRICE: refers to the FEE, or pricing value, required to successfully conduct a TX or execute a contract on the blockchain network. Pricing value correlates with network congestion[14]
*NATIVE_FEE: *4thTech* service FEE (e.g., 5$)
*FEE_DISCOUNT_FACTOR: Discount factor added if FOUR is STAKED. (e.g., 50% added discount if tier 3 staking is enabled)

Calculation formulas;
*txCostBase = GAS_UNITS * GAS_PRICE (ETH TX calculation cost formula without *4thTech* service FEE)
*txCostBaseInclFee = txCostBase + (NATIVE_FEE * FEE_DISCOUNT_FACTOR) (ETH TX calculation cost formula with *4thTech* service FEE)

FOUR Staking;
FOUR staking provides FOUR holders with rewards in the form of FOURdx service FEE margin discounts, while it enables the FOURim (i.e., instant messaging protocol) right to access. By staking, the user agrees to lock up their FOUR tokens for a certain period, during which they are unspendable. By staking FOUR, users actively support the *4thTech* ecosystem by allocating resources to it and contribute to the stability of the network. Minimalistic and intuitive web platform design enables users to stake FOUR with a single click.

Staking process;
FOUR staking will be enabled within the platform in the coming update. After choosing the staking tier, the wallet FOUR balance must be sufficient. With a single click, the FOUR funds are staked at a staking smart contract address. As FOUR is an ERC-20 token, an Ethereum smart contract transaction is executed accompanied by Ethereum TX cost. After the smart contract transaction execution, the funds are staked at the staking smart contract address and the FOURdx service FEE discounts are activated. Tier 3 staking must be used so the FOURim (i.e., instant messaging service) is activated. After the staking period, the FOUR staked funds can be claimed back.

Cost calculation overview if using FOUR Staking;
*First SC TX + Second TX = Total public-blockchain network TX_GAS cost
*Public-blockchain SC TX_GAS cost + *4thTech* service FEE_MARGIN surcharge - the FOUR

[14] https://ethgasstation.info/ [accessed 22 January 2021]

staking enabled discounts = Total user FOURdx TX cost

FOUR Staking Discount tiers;
***Tier 1**: 14 days FOUR staking: 10.000 FOUR = 10% DISCOUNT on *4thTech* services FEE_MARGIN surcharge
***Tier 2**: 30 days FOUR staking: 20.000 FOUR = 15% DISCOUNT on 4thTech services FEE_MARGIN surcharge
***Tier 3**: 180 days FOUR staking: 50.000 FOUR = 50% DISCOUNT on *4thTech* services FEE_MARGIN surcharge + FOURim ACCESS ACTIVATION

FOUR Staking Service FEE Discount Use-case;
Let's assume that:
*public blockchain TX cost = 0.03$
*FOURdx services FEE_MARGIN = 5$
*Total user cost = 5,03$
*FOUR staking DISCOUNT = 50% (if FOUR is staked at the highest tier)
*Total user cost using FOUR staking = 2,53$ settled in native token (ETH, TOL, EDG, SOL) of the chosen supported public blockchain

Specification;
*Network: Ethereum, HashNet, Polkadot, Solana
*Network type: public blockchains
*Speed: depends on the network stress
*Actual TX cost - variable (determined by ETH / TOL / EDG / SOL TX price)
*Services FEE margin in FIAT - fixed (determined by *4thTech*)
*Price calculation is dynamic (each time a user connects, current transaction price shows).
*Service FEE discounts will be enabled via FOUR token staking

Benefits;
*Transparency (open public transaction traceability)
*Open-source
*Web Platform Client (intuitive easy to use UI)
*Fast solution
*Permissionless

***Note;** Temporary 7-days data file storage cost is currently included.*

13. CONCLUSION

During the first years of public blockchain application release, business models for their use were strictly transaction-based, paying each transaction with utility tokens released by the project in question. While this was the beginning of the blockchain adoption, we are currently experiencing extreme transactions price volatility[15] of "gas" utility tokens. Utility "gas" token price volatility is directly affecting transaction costs and network congestion which is resulting in low adoption of these business models. To stimulate adoption and enable lower Layer 1 transaction cost, 4thTech embraced a multi-blockchain support approach, providing users with a choice. Even though open-chains brought transparency, volatility and network congestion makes it hard to build a sustainable revenue model. Private-chains are natively non-transparent, but they provide more constant performance, faster transactions and enable viable revenue models. In the end, the choice is yours.

14. DISCLAIMER

4thpillar technologies (i.e., *4thTech*) is a blockchain technology innovation and development initiative. Its main focus goes to the development of future experimental blockchain technology. *4thTech* does not sell four-tokens, guarantee or influence the token price or deal with financial or trading token elements, nor offer any licensed financial services, such as investment or brokerage services, capital raising, fund management, or investment advice. The content of this article is provided for information purposes only and is not to be used or considered to be an investment recommendation or an offer or solicitation to buy, sell or subscribe to any securities or other financial instruments. As we are dealing with experimental technology malfunctions can accrue, furthermore, the *4thTech* initiative cannot guarantee any deliverable deadlines as unexpected technical complications can appear.[16]

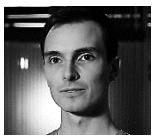
BIOS

***Dr. Tali Režun;** Slovenian, of Slovenian and Jordanian origin. Born in Ljubljana in 1978, he started his entrepreneurial career at the age of 18*

[15] How DeFi Is Driving The Spike in Ethereum's Gas Price' https://insights.glassnode.com/defi-spike-ethereum-gas-price/ [accessed 27 September 2020].

[16] https://the4thpillar.io/terms-of-use/ [accessed 24 January 2021]

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. Režun specializes in online brand awareness, web application development and blockchain technology. He enjoys the title of lecturer, advisor and UN/CEFACT expert.[17]



Denis Jazbec; *A senior software engineer with more than a decade of experience. He is researching and developing blockchain and DLT solutions and acts as a main solution architect of the 4thpillar technologies project. Denis singlehandedly innovated the 4thTech protocol of blockchain electronic data exchange. Highly proficient in PHP, JS, Vue.js, Typescript, MySQL and specializes in IT infrastructure, DLT networks and blockchain implementation, while developing in-depth knowledge on multi-blockchain processes and transactions, which makes him an expert in its field.*

[17] https://talirezun.com/ [accessed 20 May 2021]