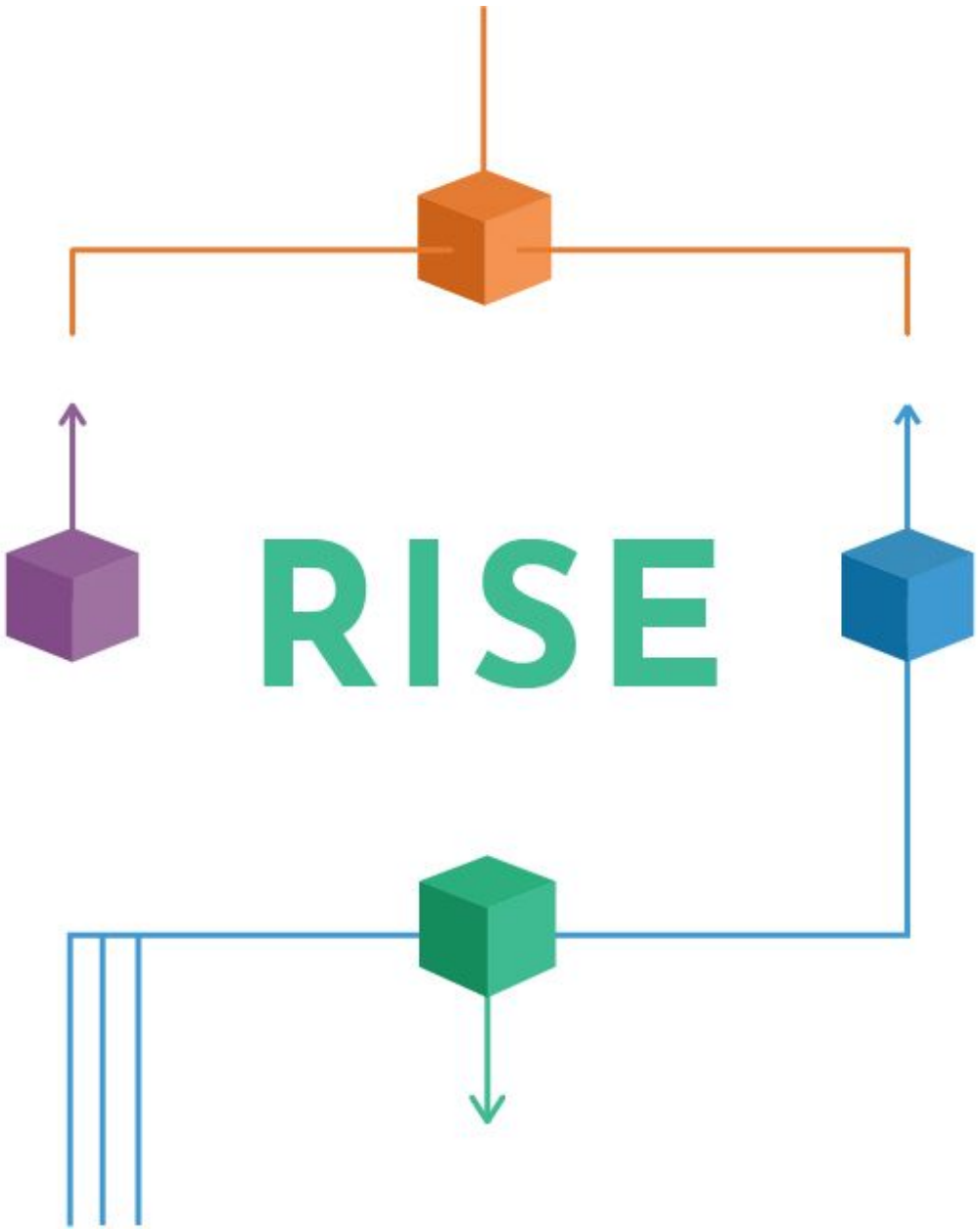

RISE

RISE Lightpaper V1

An ecosystem for developers

RISE offers a platform for Decentralized Applications (DAPPs), powered by a community driven Delegated Proof of Stake (DPOS) blockchain.

Abstract

RISE is a community-driven Delegated Proof of Stake blockchain ecosystem, using the RISE utility token to access RISE technology. RISE has been created by developers for developers to build on blockchain technology. This paper describes the core features of RISE technology and blockchain protocol, including the status of development for each feature.

RISE aims to enable developers with technology to create their own customisable DPOS blockchain ecosystem, in programming languages and concepts widely used in web development. RISE blockchain technology is developed by experienced web developers and intends to improve upon existing blockchain projects created before it.

Supporting references in this paper will be derived from existing research and the primary technical experience from core developers building RISE technology. Refer to https://github.com/RiseVision for the RISE source code.

Background

In 2008/2009, the bitcoin network was developed as a peer to peer payment network operating a cryptographic protocol.[1] The application running on the bitcoin network was Bitcoin, a digital currency. The bitcoin network uses a Proof of Work consensus mechanism, which is known to have high energy consumption and slow transaction speed.

In 2013, Ethereum was proposed as an alternative blockchain platform for decentralized applications to execute smart contracts.[2] Ethereum currently uses a Proof of Work consensus mechanism, but will be migrating to Proof of Stake through the development of the Casper project.

In the same year, Delegated Proof of Stake as a consensus mechanism was developed to be one of the fastest, most efficient, most decentralized, and most flexible consensus models available.[3] Applications with high user adoption that implemented Delegated Proof of Stake are Steemit[4] and Bitshares[5].

In 2016, the RISE Delegated Proof of Stake network was created. A community driven blockchain, that is eco-friendly and decentralized through allowing RISE holders to contribute to the network by voting in 101 block producers, known as Delegates, based on amount of RISE staked in their wallets. RISE aims to enable web developers to build decentralized applications with popular programming languages using RISE technology.

[1] Bitcoin: A Peer to Peer Electronic Cash System. Satoshi Nakamoto.
[2] Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform.
[3] Delegated Proof of Stake Consensus. Bitshares.
[4] Steem Whitepaper.
[5] Bitshares.org.

1.0 Introduction to RISE

RISE is a community-driven blockchain ecosystem, written in TypeScript, for the development of decentralized applications. The RISE blockchain operates a Delegated Proof of Stake consensus mechanism, which is in mainnet. Furthermore, RISE is a utility token used within the RISE blockchain network for access to the software, security features and transaction fees.

1.1 Vision

The vision of RISE is to enable developers with technology to create their own customisable DPOS blockchain ecosystem, in programming languages and concepts widely used in web development.

1.2 Problems RISE Aims to Address

According to Evans Data Corp it is estimated that there are 23 million software developers globally.[6] The demand for developers will increase exponentially over the next decade as every single industry becomes more reliant on technology everyday.[7] Furthermore, DataUSA found that software (applications & systems) developers account for approximately 1.26 million of the total workforce in the United States with a projection of 17.8% growth over the next 10 years.[8] As of 2017, the global blockchain technology market is predicted to reach 339.5 million U.S. dollars in size and is forecast to grow to 2.3 billion U.S. dollars by 2021.[9] Gartner uses forecasting methodology to quantify the value of technology innovation and predicts that the business value-add of blockchain will grow to more than $176 billion by 2025, and then it will exceed $3.1 trillion by 2030.[10] This emerging market with great expected valuation requires the skills and talent to achieve the anticipated results. Nick Szabo, the initial founder of the concept and phrase ‘smart contracts’, believes there is an extreme ‘$/knowledge’ ratio,

[6] Global Developer Population and Demographic Study 2018 Vol. 1. Evans Data Corp.
[7] Will The Demand For Developers Continue To Increase? Forbes.
[8] Software Developers, Applications & Systems Software. USADATA.
[9] Size of the blockchain technology market worldwide from 2016 to 2021 (in million U.S. dollars). Statista, 2018.
[10] Forecast: Blockchain Business Value, Worldwide, 2017-2030. Gartner, 2017.

where capital outweighs talent.[11] Developers with blockchain skills are highly sought after in 2018 and will continue to be as the market develops and more business adopt blockchain technology. In 2017, the GitHub reached 24 million developers with open source projects written in over 337 unique programming languages. Github highlighted that the most popular languages were JavaScript, Python, JAVA and the fastest growing in popularity was TypeScript.[12] RISE core codebase is written in TypeScript and RISE technology will be developed with popular programming languages and concepts used in web development.

1.2.1 Limited Blockchain Development Technology and Knowledge

There is a higher barrier to entry for web developers due to blockchain technology itself. Most well known and longest running blockchain technologies use C++ or Solidity, influenced by JavaScript, C++, Python, PowerShell. There are also new experimental programming languages being designed for blockchain technologies and smart contracts, such as Vyper.[13] With these new and complex programming languages, developers could find the process frustrating and eventually desist exploring blockchain technologies.

RISE technology is built using only widely known concepts and web technologies such as, TypeScript/JavaScript, SQL Database and HTTP for the communication layer. TypeScript is a more robust language for blockchain technology to be written in as it provides optional static typing, classes and interfaces.[14] TypeScript is known to be the chosen language for large web projects and web developers see the benefits of a TypeScript codebase over JavaScript. Another benefit of TypeScript is that it compiles to JavaScript, therefore developers have the option to develop in either language. With this flexibility, the developer communities that can use RISE technology is even greater than before, ultimately increasing adoption of blockchain technology.

[11] Blockchain Engineers are in demand. Techcrunch, 2018.
[12] The State of the Octoverse 2017. Github.
[13] Ethereum Vyper.
[14] TypeScript - JavaScript That Scale. Microsoft.

1.2.2 Scalability of Blockchain Solutions

One of the most prevalent problems faced by many blockchain solutions is scalability with regards to transaction throughput. According to a thesis by Tetras Capital, there is currently no DApp that has more than 5,000 Daily Active Users or 50,000 daily transactions.[15] There is a need for a blockchain solution to accommodate an increase in user adoption and modules to customise scalability features such as block producers and transaction throughput as required by individual applications. Vitalik Buterin first addressed the pursuit of decentralization, security and scalability with the concept known as the 'scalability trilemma'. At present most existing technology either is decentralized and secure or scalable which compromises decentralization to an extent. [16] A solution for this issue is Delegated Proof of Stake and the RISE protocol of 101 block producers which ensures scalability without compromising security. Decentralization is achieved through each RISE holder having one vote per wallet to contribute to electing block producers and network validators. Bad actors can easily lose their position as a validator in the network through flexibility of the network, as opposed to relying on processing power from a central entity.

[15] Ether (ETH) Bearish Thesis: The "Flippening" of Market Irrationality. Tetras Capital, 2018.
[16] Blockchains and the Scalability Problem. CryptoPotato, 2018.

1.3 Who Would Use RISE Technology?

RISE technology is primarily built for developers familiar with web development programming languages and concepts. At the foundation of any technology business and their objectives to have a DPOS blockchain ecosystem will be a developer or development team familiar with the RISE technology stack. RISE technology will be customisable and therefore, applicable across a wide range of industries and companies.

1.3.1 New Startups

New young companies or startups, beginning to develop their ideas and products would be ideal adopters of RISE technology. These startups tend to be small with a few founders or developers and agile in their approach to development, testing and taking their product to market.[17] As smaller companies have less manpower and financing, a smart approach would be to use RISE technology to develop their blockchain based decentralized applications.

1.3.2 SMEs

Small to medium sized enterprises tend to have smaller budgets for exploring new technology. However, they are some of the first to innovate. Therefore, technology teams at SMEs may look to open source technology that they can adopt and customise. Across the European Union, small to medium sized enterprises account for nearly 99% of all businesses.[18]

1.3.3 Blockchain Proof of Concept Teams

Larger businesses may wish to explore RISE technology as a Proof of Concept to address specific business objectives. These endeavours are highly likely to be experimental pilot projects incubated within established businesses aiming to transition to blockchain technologies or create new applications as part of existing technology offerings. Enterprise businesses are presently being serviced by enterprise-level

[17] What is a startup? Investopedia.
[18] What is an SME? European Commission.

technology providers, such as IBM, Microsoft, Accenture, SAP, Deloitte and PWC.[19] A survey conducted by Deloitte found that 40% of enterprises will invest $5 million or more in blockchain technology in the near future.[20] RISE believes there are larger businesses that want to move towards blockchain technology for specific use cases, however, not all businesses are able to allocate the budget that enterprise-level service providers demand. Top blockchain use cases are still identifiable as supply chain, Internet of Things projects, digital records, payments applications, and digital currency, however, the survey found that 22% of enterprise respondents lack a compelling application to justify implementation. Although larger businesses are more established and stable, they face larger obstacles to innovate. These barriers to innovation can range from politics, culture, inability to act on signals crucial to the future of the business, lack of budget and strategy.[21]

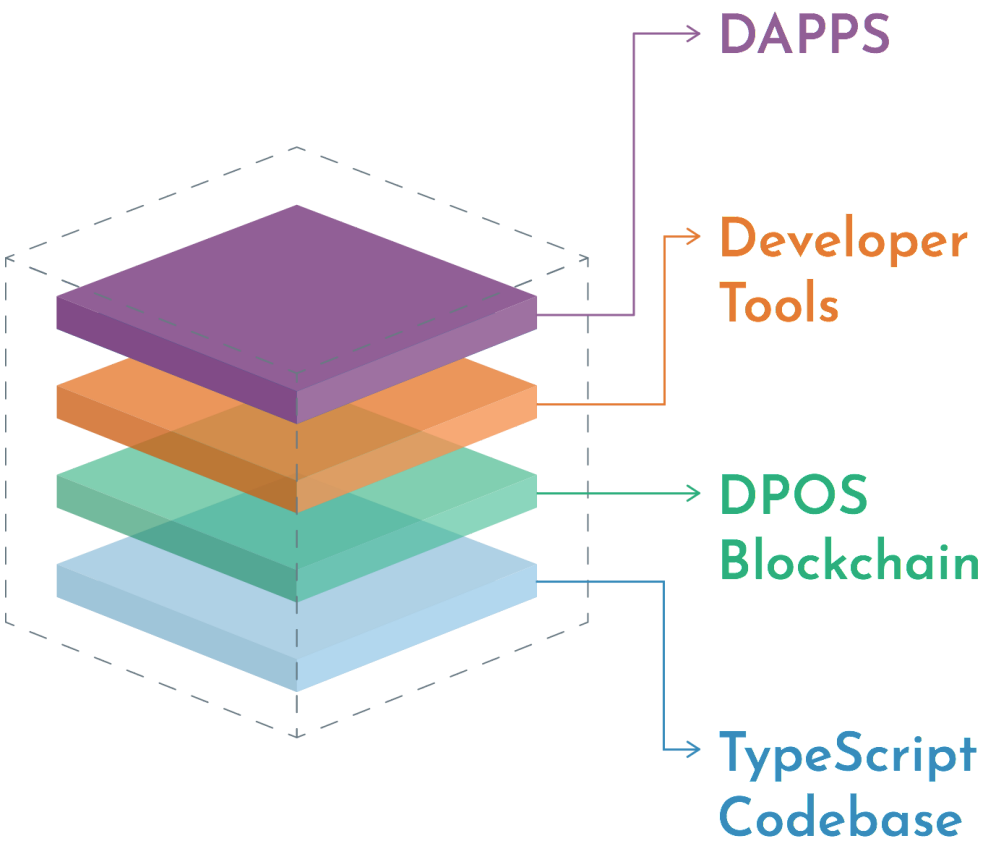
2.0 Decentralized Applications (DAPPs)

Decentralized Applications, also known as DAPPs, are applications running on peer to peer network and not controlled by a single entity.[22] Not all decentralized applications (for example, BitTorrent, BitMessage, Tor) run on blockchain. However, RISE and its developer tools will provide developers seeking to create DAPPS are based on RISE blockchain technology. For a blockchain based application to be considered a DAPP, it must embody the following characteristics:

- **Open-source** - operating autonomously and available for adaptation of the protocol based on proposed improvements and feedback.
- **Blockchain powered** - data must be cryptographically stored in a public, decentralized blockchain, avoiding single points of failure.
- **Tokenization** - access to the application and any reward for contribution to the network requires a token.
- **Cryptographic Algorithm** - token generation according to proof that nodes are contributing to the network. Bitcoin uses Proof of Work. RISE uses Delegated Proof of Stake. [23]

[19] Enterprise blockchain solutions: Know the major players.
[20] ConsenSys, Deloitte, and SAP Tip Enterprise Blockchain Moves.
[21] The Biggest Obstacles to Innovation in Large Companies. Harvard Business Review.
[22] What is a DAPP? Ethereum Stack Exchange.
[23] The General Theory of Decentralized Applications, Dapps. David Johnston et. al.

RISE will enable developers to create DAPPs with RISE developer tools in programming languages and concepts familiar to web developers.



3.0 RISE Blockchain Protocol

Status: Live

3.1 RISE Delegated Proof of Stake

RISE operates a Delegated Proof of Stake (DPOS) consensus mechanism.

RISE DPOS requires Delegates to produce blocks. Delegates are accounts that are elected to be 'Active Delegates' by the RISE community. The Delegate accounts with the most weighted votes according to the total RISE voted, can create new blocks in the blockchain. The RISE network allows for 101 active Delegates to be elected block producers. Delegates that fall outside the 101 are listed as 'Standby Delegates', and can advance to the active list by receiving votes from other RISE holders. All users of RISE have one vote available per wallet to elect their chosen delegate. The weight of each vote is proportional to the amount of RISE the user has in the wallet the votes are cast from.

Delegate promotion to the active list or demotion to the standby list happens at the completion of the block generation cycle. Each round (cycle of blocks) is created by the top delegates in a deterministically computed order at each round end (block cycle end). The block time is 30 seconds. Newly created blocks are broadcast to the network and added to the blockchain. A transaction can be considered confirmed after one block has included the transaction. However, after six or more confirmations, the transaction is considered securely confirmed. The round (block cycle) must complete 101 blocks, which is the number of active delegates. Assuming all active delegates are fully productive, the round time will use this logic:

*101*blockTime => 101*30secs*

In DPOS, forks can occur, but the longest fork wins. A fork is a change to the protocol, or a divergence from the previous version of the blockchain. Delegates must be online at all times and have sufficient uptime. Uptime is used to catalogue the reliability of a node by logging each time that it misses a block that was assigned to it.

Delegates can be removed, or demoted from active delegate to standby delegate, by being unvoted, if they miss blocks, or if they are not on the same blockchain as the majority of the rest of the delegates. There is no autoexclusion mechanism for delegates. When a delegate is removed, it must correct its blockchain to the one of the majority, and have more votes than the delegate that replaced them, to be placed back in the 101 block generation cycle.

3.2 Delegates

To become a Delegate, a user must register a Delegate account. This can be accomplished from the user's RISE wallet. The account address will be the same after the delegate registration. All RISE accounts are eligible to become delegates and register corresponding usernames.

New delegates begin as standby delegates. Standby delegates begin with an approval rating of 0% and will need to accrue votes from the RISE community in order to advance to be one of the top 101 delegates. Block generation is performed by the top 101 delegates only. If you are in standby status, you will not forge any blocks.

In the future, the 101 limit can be revised to increase the number of active delegates and add greater responsibilities for standby delegates. The role active and standby delegates play in the network, ultimately increases decentralization.

3.3 Forging

Forging is another term for block generation in the RISE network. For those familiar with Bitcoin, forging is comparable to mining. Every RISE account can enable forging, but only the elected 101 active Delegates will actually forge and be awarded RISE for generating blocks. Forging can be enabled by running a full node with RISE software. Standby Delegates, or other node operators, will still validate the work from the active Delegates. If a Delegate misbehaves other nodes will not accept the forged block. This facilitates decentralization and discourages Delegates intending to misbehave, or act in cartel like operations, from changing rules in their favour.

3.4 Block Rewards and Reduction Schedule

Prior to block 1054080, 16th June 2018, each block produced 15 RISE. Since block 1054080, each block produces 12 RISE. The timeline for block reward reductions is outlined below:

Year 1: 15 RISE per block (14.33% inflation)
Year 2: 12 RISE per block (10.03% inflation) reduced at block 1054080
Year 3: 9 RISE per block (6.84% inflation)
Year 4: 6 RISE per block (4.27% inflation)
Year 5: 3 RISE per block (2.05% inflation)
Year 6+: 1 RISE per block forever

This schedule can be revised in the future based on community consensus to make changes to the coded schedule.

3.5 RISE Network

Status: Live with over 875+ Delegates

3.6 Network Specifications

RISE network specifications, differentiating RISE from other Delegated Proof Of Stake projects. The technical differentiators are as follows:

- 1 Vote Per Wallet with a vote weight equalling the amount of RISE in wallet
- 101 Elected Delegates to actively produce blocks
- 30 Seconds of Block Time
- 50 minutes and 30 seconds Round Time

3.7 Network Fees

All valid transactions in the RISE network must be processed. Active RISE Delegates process transactions and store them in new blocks. For this work, the Delegates receive a fee. All transactions in the network must generate some type of fee as a spam countermeasure and deterrent.

The default network fee for processing one RISE transaction is 0.1 RISE. For example, a 100 RISE transaction includes an additional fee of 0.1 RISE for a total transaction amount of 100.1 RISE.

The following is a list of fees for different types of transactions:

- 0.1 RISE for a spend transaction
- 5 RISE for registering a second passphrase
- 25 RISE for registering as a delegate, includes adding a username
- 5 RISE for registering a multi-signature group

Active Delegates receive the fees from all transactions at the end of each round time as well as a fixed amount of RISE per forged block determined by the reduction schedule.

The number of blocks in a round is dependent on the number of active Delegates, which is 101 elected through community votes. If an active Delegate is not online the number of blocks in a round (block cycle) is still 101 and the network will enlist another active Delegate.

At the current reward schedule, active Delegates receive a fixed 12 RISE per round time. If a block is missed by a Delegate, the next active Delegate in line who forges that block will receive double the amount of RISE awarded (24 RISE).

In addition, at the end of each round time, all transaction fees of each forged block in a round are collected, summed and then divided by the number of blocks (101). Each active delegate who forged more than one block (because another active Delegate missed a block) will receive the transaction fee amount multiplied by the amount of blocks this Delegate forged in a round. One Delegate could forge two or even more blocks (in rare cases) per round.

Delegates who missed creating a block assigned to them during that round are not rewarded.

3.8 RISE Accounts

Status: 18602 RISE accounts exist as of block #1076660

RISE accounts will be identifiable through a string between 1 and 21 characters (numbers) plus the letter 'R'. All accounts are searchable through the RISE Block Explorer. [24]

BIP39 (Bitcoin Improvement Protocol) is the implementation of a mnemonic code or mnemonic sentence (a group of easy to remember words) for generating deterministic keys. RISE integrates mnemonic checksum of passphrases to make sure it conforms to the BIP39 standard and that passphrase is used to generate your account.[25]

3.9 RISE Client/Web Wallet

Status: Live/Upgrade in Progress

The RISE client, also referred to as RISE web wallet, enables users to manage their account from anywhere with an internet connection. Users are able to send transactions with the RISE wallet, vote for a Delegate and register for a Delegate themselves. Currently, the RISE wallet can be accessed through a web browser. [26]

Using a web wallet gives users access to the blockchain, without the need to download the entire blockchain to their computer. Downloading a whole copy of the RISE blockchain requires users to set up a full node on a VPS (Virtual Private Server)/Virtual Machine or local dedicated server.

The RISE wallet is being rewritten in TypeScript, a typed superset of JavaScript and React, which offers reusable UI components.[27] A new release of the RISE wallet will provide a progressive multi-platform client, that can be installed as a desktop or mobile app. Based on user testing the web wallet will be responsive on multiple devices and aim to have enhanced user experience.

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[24] RISE Block Explorer.
[25] Bitcoin Improvement Protocol. Satoshi Labs.
[26] RISE Web Wallet.
[27] React. Facebook Open Source.

RISE will be adding Nano Ledger support to give users the option to store RISE in the most secure way possible.[28] Hardware wallets provide an added level of security against computers or mobile devices that may be infected with keyloggers or other malware.

3.10 RISE Performance (Transactions Per Second)

Status: Live

At present, RISE can accommodate 50 transactions per minute as RISE is hard limited on the number of transactions a block can hold. Each RISE block can hold 25 transactions. As RISE has a blocktime 30 seconds, the following logic will apply:

*1m/30s * 25 => 50*

Currently, it is not imperative for the RISE blockchain to support a higher amount of transactions per second as ~1500 transactions are processed and broadcasted every day. There is currently an enforced limit of 25 transactions per block for the RISE mainnet.

Rigorous internal testing has resulted in the number of transactions the new RISE core 1.1.0 will be able to handle, namely more than 1000 transactions per second on mid-level hardware. Benchmarks shows that the new RISE core is capable of handling up to 1000 transactions per second* with a i7–7700 CPU. To compare, Ethereum can only process 15 TPs and Bitcoin can only process 7 TPs due to block size limit 1MB.[29]

1000 transactions per second is not a requirement for the RISE mainnet blockchain at present. However, a requirement for 1000 transactions might be essential for a future DAPP developer requiring a much higher transactions per second value and this will be possible based on RISE core technology. [30]

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[28] Ledger Wallet. Ledger.
[29] RISE Core 1.1.0/1.1.1 — Technical Overview
[30] RISE Core 1.1.1 — Mainnet


RISE

3.11 Atomic Block Processing

Status: Live

The need for atomic block processing is to restore data integrity, which is crucial to blockchain technology. RISE is one of the only DPOS blockchains forked from Crypti to introduce and execute atomic block processing in mainnet.

When a block is received by the node, the node will try to apply its transactions and ultimately save the block in the database. Prior to the release of RISE core 1.1.1 if an error occurred while applying one of the included transactions, the code needed to roll back on the previously committed transactions to achieve data integrity. This is known as roll back logic, which was error prone and complex. RISE is now delegating the roll back procedure to the database, which is designed and battle tested to perform this specific kind of rollback if unforeseen issues arise affecting the blockchain.

3.12 Dynamic Fees

Status: Future Release

As blockchain technology and cryptocurrencies become widely adopted, there becomes a need for a more reliable fee structure to accommodate congestion on the network. Dynamic fees aim to detect changes in volume and will raise or lower transaction fees accordingly to accommodate network congestion. Scheduled for release in RISE core 2.0.[31]

[31] Introducing Dynamic Fees. Blockchain Team.

4.0 RISE Developer Tools

4.1 API (Application Programming Interface) Libraries

Status: Live/Open Source

RISE APIs are a set of functions allowing developers to access RISE blockchain data for the creation of applications.

RISE APIs allow developers to, among other functions:

- Request information about an account
- Request information about blocks
- Request information about delegates
- Request information about node loading status
- Create and request information about MultiSignature accounts
- Request information about peers
- Count, send and request information on transactions

4.2 Software Development Kit

Status: Q1 2019

Adoption of blockchain technology has been relatively low and barrier to entry for developers has been high due to complex programming languages, and a lack of easy to use tools.[32] RISE aims to reduced the barrier to entry for web developers by creating Software Development Kits in popular programming languages using familiar web concepts well known and used by developers globally.

The first Software Development Kit to be released will be in TypeScript, which caters to the TypeScript and JavaScript developer market. The RISE SDK will enable web developers to create and customise their own blockchain ecosystem, based on the

[32] Full Stack Development Tools Lowering Blockchain Entry Barriers. CoinTelegraph.

RISE DPOS blockchain. Developers will be able to programme applications and launch their own blockchains using and modifying RISE developer tools.

4.3 RISE Technology Stack

The entire technology stack RISE uses is widely known amongst developers. This will ease the entry barrier for any non-blockchain developer who would like to join the blockchain world.

4.3.1 Typescript Codebase

Status: Live in Mainnet

The RISE codebase has been rewritten in TypeScript 2.8 to enhance scalability, maintainability and code quality for better future development. TypeScript is a strict syntactical superset of JavaScript used in large web development projects.[33] It is an open source programming language developed and maintained by Microsoft, enforcing good coding standards. The RISE blockchain node and source code is openly available for installation.[34] The RISE core codebase has had over 2000 unit tests and over 250 builds to ensure the code behaves as intended with 99% code coverage.

There are significant advantages to migrating from JavaScript to TypeScript such as, static typing checks to identify more bugs when compiling and TypeScript is easier to learn for JavaScript developers.[35]

All third party dependencies were updated leveraging bug fixes and performance improvements. The RISE core is now shipped in a self-contained package file that contains all the needed dependencies that the core requires to run, a significant improvement since 0.x.x core, as the previous installation of third-party software was delegated to the node-operator. Reducing human intervention in the process of node installation will augment the network stability in both the short and long term.

[33] TypeScript - JavaScript That Scale. Microsoft.
[34] RISE Github Source Code for Node Installation.
[35] The Benefits of Migrating From JavaScript to TypeScript. Raphael Feng.

Furthermore, RISE technology previously had a mixed “code”+”sql” codebase, whereas in RISE core 1.1.1 every basic SQL statement has migrated to Sequelize reducing the amount of SQL statements by 80%. Sequelize is a promise-based ORM for Node.js v4 and up, supporting PostgreSQL, MySQL, SQLite and MSSQL and features solid transaction support, relations and read replication.[36] RISE aims to be developer friendly technology, therefore, Sequelize will ease basic SQL statements and allow future developers to express their queries using just code. However, RISE is designed with flexibility in mind therefore, if required a developer could still express his queries using SQL.

4.3.2 Node.js

Node.js is a very popular Javascript runtime environment built on top of the Google’s Chrome V8 Javascript engine.[37] Node.js has become very popular among both independent developers and large institutions. Due to its popularity the number of developers who have experience with node.js is significant.

4.3.3 PostgreSQL

PostgreSQL is a widely used DBMS. It is heavily tested and uses standard SQL syntax which is broadly used by developers of any kind.[38]

4.3.4 Peer to Peer Communication via HTTP

Blockchain nodes communicate through simple HTTP requests. Unlike other blockchain solutions which either uses RPC or other transport mechanisms, HTTP is well known, battle tested and the main protocol of the World Wide Web.

[36] Sequelize.
[37] Node.js. Joyent, Inc.
[38] PostGreSQL. The PostgreSQL Global Development Group.

5.0 Sidechain Technology / Build Your Own Blockchain

Status: Q1 2019

The concept of RISE sidechain technology is to enable DAPP developers to create, customize and build their own DPOS blockchain ecosystem. RISE aims to develop sidechain technology to allow developers and businesses to build applications with token assets on RISE in the future. Each DAPP will have its own sidechain, and developers are in control of the architecture they desire for their application. Customisation will be possible with transaction fees, the number of block producers being decided by the creator of the DAPP, all of this implemented through RISE developer tools. Sidechains are best for commercial use of a blockchain, thus key to any future projects built on RISE with our developer tools.

The RISE mainchain and sidechains will know and be aware of each other. The mainchain and sidechains will be able to communicate, and several mechanisms will exist to allow the exchange of tokens from mainchain to sidechain and vice-versa.

At first, a sidechain will only be allowed to send and receive its own tokens to and from the RISE mainchain. The RISE solution is flexible by design and in the future a mesh network may enable sidechains to communicate with other sidechains.

5.1 Building Blocks

RISE technology targets web developers. Therefore, we will ensure by design that creating a sidechain is as easy as writing a configuration file that defines which elements/components the sidechain will use.

Example 1: Multisignature.
The current RISE mainchain has a multisignature functionality, but a sidechain might decide to not have such a feature enabled in its core, effectively reducing the amount of code and potential bugs.

Example 2: The p2p layer.
A sidechain might want to use a different communication layer between nodes and implement its own.

Example 3: The consensus rules.
RISE uses Delegated Proof of Stake. While DPOS is one of the best consensus currently available in the industry for RISE at present, the same cannot be said for a future sidechain which might want to implement their own consensus rules.

RISE Core version 2.x will try to abstract as much as possible and allow for future sidechain developers to improve and/or **change** the internal behavior; sidechain developers will only be required to implement a “contract” or a so-called interface in order to ensure interoperability between RISE components. [39]

5.2 WordPress As An Inspiration

WordPress is a very popular content management system (CMS). Wordpress is widely used and known to power 26.4% of the entire web and third party developers have to date created over 44,622 plugins for it. [40] Wordpress became very powerful through it’s plugin system; hooks are provided by WordPress to allow plugins to 'hook into' the rest of WordPress; that is, to call functions in your plugin at specific times, and set your plugin in to action.[41]

In RISE core 2.x this concept will be adapted to incorporate the TypeScript/JavaScript language and blockchain technology. A TypeScript plugin will be used to mimic the fast and easy to use *hook* concept, commonly found in Wordpress, with customisable components that will not alter the working RISE codebase.[42] RISE will leverage these concepts and be highly suitable for web developers that have used WordPress and understand its powerful concepts.

[39] Interface Computing. Wikipedia.
[40] 21 Amazing Wordpress Stats. Digital.com.
[41] Plugin API. Wordpress.org.
[42] MangiaFuoco by Vekexasia. Github.

5.3 Tokens

Tokens will be created directly in the RISE mainchain. The RISE mainchain can be used to host all the tokens. Similar to the concept used by Ethereum technology, a single passphrase could provide access for holdings of both RISE and the tokens associated to that account that live in the RISE mainchain. Tokens can be transferred in RISE's mainchain the same way RISE is currently sent and received.

5.3.1 Token Creation

Creating a token in RISE will be easy and the process will be available to any RISE holder. Creating a new token will require spending RISE.

Creating a Token will require filling a set of fields, including but not limited to:

- Token name*
- Token supply*
- Token description*
- Token tags*: comma separated list of strings
- Token URL (e.g. Website)
- Token Icon (base64 encoded png 128x128)

**required fields*

The minimum fee or cost of such transaction will be dynamically calculated using the space taken by the transaction once included in the blockchain as multiplier factor.

To ensure common or existing token names are not registered, there will be a predefined list of invalid token names (e.g. BTC, ETH, EOS).

5.3.2 Token Life and Management

Tokens could live both in the RISE mainchain and its own sidechain or other sidechains if they are designed to handle multi tokens.

Keeping the tokens in RISE mainchain will have the benefit of using a single wallet to manage a portfolio of different tokens.

Note: Having a token created in the mainchain, could also allow a faster integration with third party services such as exchanges since there will be a single API to manage both RISE and the tokens.

Once created, tokens cannot be erased. But in some rare exceptions we could make sure to hide some “malicious” tokens from RISE official tools such as the wallet and the explorer. It is important to notice, that such ‘bad’ tokens will still be available in the blockchain and could still be sent/received by unofficial/community supported tools as RISE does not (nor will) have the power to change the blockchain because of its decentralization properties.

5.3.3 Token Transfers

To allow cross blockchains token transfer, RISE will adopt heavily used and tested concepts from Bitcoin. One concept is Hashed Time Locked Contracts (HTLC).[43] By using Hashed Time Locked Contracts, RISE will be able to exchange tokens from sidechain to mainchain securely in a trustless way.

To ensure even more security a new figure called ‘Bridgers’ will be created to allow such token transfers. ‘Bridgers’ will be the middleman operators that will allow transferring tokens from the sidechain to the mainchain via Hashed Time Locked Contracts. While ‘Bridgers’ could be also used to transfer tokens from the RISE mainchain to the sidechain, they will not be necessary as sidechain nodes will also run a local mainnet node.

An example for reference:

1. Alice has 1000 side tokens safely stored in the sidechain.
2. Alice wants to send 500 side tokens to the RISE mainchain.

[43] Hashed Timelock Contracts.

3. Alice looks for available Bridgers through the explorer. Picks one that suits her needs (Charlie) and broadcasts a Hashed Time Locked Contract transaction with 500 + FEE side tokens using Charlie as the destination.
4. Charlie waits for such a transaction to be accepted in the network by waiting for a certain number of block confirmations.
5. Charlie creates a new Hashed Time Locked Contract transaction in the RISE mainchain using Alice's publicKey and the same prehash image Alice used.
6. Alice validates the transaction and completes it by filling in the prehash making it valid in the RISE mainchain.
7. Since the pre hash value is now known to Charlie, he can close the Hashed Time Locked Contract in the sidechain collecting the 500 + FEE from Alice.

We could expect this to create a Bridger ecosystem allowing individuals to get rewards by also securing both the sidechain and the mainchain.

Charlie could eventually run out of sidetokens in the RISE mainchain precluding his ability to offer his services to sidechain users. He could either decide to offer negative fees to rebalance his account or create a cross blockchain transaction that only Bridgers are allowed to broadcast.

To enable Bridgers to concurrently rebalance from sidechain to mainchain, they will need to burn (within the sidechain) the tokens they wish to send on mainchain. This type of burning transaction will also include a payload that will be used to issue an inbound transaction on the mainchain which will need to reference the burning transaction along with its payload. The inbound transaction will immediately be included in the mainchain blockchain, but funds will be locked for a specified amount of blocks. This process is subject to change as new and emerging technologies arise and achievements made within the RISE mainchain.

To ensure that the above mentioned process is not exploited, a yet to be finalized process will be set in place that allows RISE holders to open (or vote on an existing) some kind of dispute, via a special transaction, during the locking timeframe.

6.0 RISE Resources

RISE Github
RISE Blockchain Node
RISE Website

RISE Block Explorer
RISE Delegate Monitor
RISE Activity Monitor
RISE Network Monitor

RISE TypeScript/JavaScript API
RISE Python API
RISE JAVA API

RISE Developer Slack
RISE Telegram