

Sapien White Paper

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Abstract

Index terms: blockchain, blockchain wallet, rating systems

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1 Sapien’s Vision

Cryptocurrencies and other blockchain-based technologies have the potential to make the world more secure and self-governed. However, to this day, no consensus-backed currency has been able to appeal to the mass market and reach mainstream adoption.

Bitcoin has established itself as the "digital gold", and Ethereum has proved to be an efficient platform for token crowd sales. However, there is no current standard cryptocurrency used for the regular exchange of value in the daily lives of ordinary people. The blockchain ecosystem needs a decentralized counterpart to everyday money. There is a need in a truly user-friendly crypto wallet and mass-market cryptocurrency.

Despite their revolutionary potential, existing cryptocurrencies lack qualities required to attract the mass consumer. There are three main hurdles in today’s crypto-environments:

- The established blockchain networks — Bitcoin and Ethereum — play important roles in the ecosystem. However, they don’t have the capacity to replace VISA or Mastercard. In their current architecture they are limited to a maximum of only 7 transactions per second for Bitcoin and 15 transactions per second for Ethereum, resulting in insufficient speeds and higher transaction costs. This is the scalability problem.

- Regular users starting to engage with Bitcoin and similar technologies often get confused when trying to buy, store, spend and send their coins. In a sense, cryptocurrencies and blockchain are a very new and emerging technology. It is difficult for the average person to grasp the concept of a decentralized digital currency.
- The market of goods and services that can be bought with cryptocurrencies is limited, and the demand for most crypto-assets comes mainly from investors, not consumers.

The current state of blockchain technology resembles automobile design in 1870: it is promising and praised by enthusiasts, but inefficient and too complicated to appeal to the mass market. As a result, no cryptocurrency or decentralized platform has gone truly mainstream, and centralized solutions continue to dominate the market.

Exchanging value should be as easy as exchanging information, and blockchain technology offers the ideal foundation to make this a reality. To reach mainstream adoption, a cryptocurrency — and its underlying blockchain design and ecosystem — requires: Speed and scalability that allows for processing millions of transactions per second and potentially accommodating billions of active users.

- Intuitive and user-friendly interfaces that enable an average user to easily buy, store, and transfer value, as well as use decentralized apps in a natural way.
- An engaged user base that drives demand for services in the ecosystem and provides pre-existing critical mass for future growth.

Sapien is uniquely positioned to establish the first mass-market cryptocurrency wallet by providing a platform that combines these properties.

Sapien's big goal is to become Visa/Mastercard alternative for the new decentralized economy. We believe that a whole new economy saturated with goods and services sold for cryptocurrency will be born — similar to WeChat's fiat-based marketplace, but not confined to a centralized service.

1.1 Trust relationships between humans

Trust pervades human societies. Trust is indispensable in friendship, love, families, and organizations, and plays a key role in economic exchange and

politics. In the absence of trust among trading partners, market transactions break down. In the absence of trust in a country's institutions and leaders, political legitimacy and the citizen's peace of mind breaks down. Trust contributes to economic, political and social success.

The lack of trust has evident consequences for real-world issues in health, politics, terrorism, the workplace, and personal relationships. For example, if you don't trust your doctor, it is much harder to benefit from professional advice. People have to trust each other to cooperate, build relationships and get benefits.

We understand how much credibility and trust value for everyone in our modern world. And Sapien is going to break the ice of distrust.

The company aims to solve trust issues between individuals in a technological way, ensuring data security for every single person. We believe that financial transactions is more revealing and provides more insight on human than sites such as LinkedIn or Facebook. Also, this will be information that you can trust. The data is encrypted and the hash is stored on the Jaxnet blockchain, your data is kept private and only shown upon your approval of a request.

As it stands, there is no unified global rating, in which individuals can rate other individuals or businesses (and vice-versa). There isn't a trustful rating that someone can refer to when making decisions regarding trust when it comes to another individual or business.

Sapien's mission is to connect trustworthy people and businesses for beneficial interactions and promote a more trustful environment via the Sapien rating system.

The benefits of having such a trusted platform:

- More beneficial business transactions
- Connecting trustworthy people/business with one another using fewer resources
- An overall reduction in risk
- Decisions can be made more quickly and with more accuracy
- Encouragement in positive human behavior

2 Other unsolved problems

2.1 User unfriendly payment solutions

Solutions created by Venmo, the upcoming Facebook's Libra and Telegram's TON are at the low starting to bring payments to a new level of simplicity and accessibility for users all around the world. For Sapien being user-friendly means using simple nicknames or usernames for transactions and making it incredibly easy for users to send and receive payments.

At the moment, most cryptocurrencies are difficult for the average person to operate, because it involves them being in charge of their own data security (which is troublesome to most) and also user-friendly interface users can utilize to access their wallet doesn't exist.

To solve this, Sapien is launching Sapien in parallel with the Jaxnet Blockchain.

GoSapien will be a centralized user-friendly interface that matches a user's cryptocurrency public key with a username. This way, users are able to use an easier, secure and more familiar interface when accessing their cryptocurrency. Also, sending and receiving cryptocurrency will become as easy as sending someone a message on a messaging app. Also, when transactions are made on GoSapien, it will encourage the user to give a rating and review after the transaction has concluded, the data will then be stored on the decentralized Sapien Blockchain.

2.2 High Cost and Complexity of Financial Networks

1.7 billion adults around the world are out of the financial system, not having access to traditional banks, even though one billion of them have a mobile phone, and almost half of this number has Internet access. All over the world, people with less money are paying more for financial services. Hard-earned income are eroded by fees, from remittances and wire costs to overdraft and ATM charges. Sapien's biggest mission is to connect the world in a unified financial ecosystem. We believe that global, open, instant, and low-cost movement of money will create immense economic opportunity and more commerce across the world.

2.3 Blockchain Scalability Problem

The existing Blockchain technology has yet to find its global audience. The massive use of blockchain and cryptocurrency technologies is hampered by their volatility and low scalability, which until now have made them a bad way of accumulation and a means of money circulation.

A major issue as to why cryptocurrencies and blockchain technology hasn't caught on is because of the blockchain scalability issue. Most people are unwilling to wait any amount of time when having to make a transaction. To put in perspective, Bitcoin can only process 7-10 transactions per second, compared to 1,700 per second by the credit card company Visa (who can theoretically process upwards of 50,000). The more a cryptocurrency or blockchain becomes popular, the more people will be transacting on it, leading to immense traffic and waiting time.

Sapien believes that we have found the solution for the Blockchain Scalability Problem.

3 Current Alternatives

There are many competitors which operate with certain elements of Sapien, however, they cannot be regarded as direct competition as their service does not have certain key aspects that Sapien have and/or operate in a similar way and serves another purpose.

Listed below are competitors that have the most similarities to Sapien, that may have the potential to reduce Sapien's market share.

3.1 Zhima / Sesame Credit

Sesame Credit seems to be the most similar service to Sapien. A social credit system in China created by the Alibaba group to give a score to its users based on:

- Identification: Education and career background
- Ability to pay back: Personal asset, real estate management, wealth management
- Credit History: Past credit application and payment

- Social Connections: Trustworthiness of friends
- Behavior: Shopping patterns, items and services purchased, quantity

This is possible because of the purchasing behavior of the Chinese people (typically will use mobile payment with AliPay or WePay) allowing the massive Chinese conglomerates to collect transaction data and create a score from it.

Sesame credit also offers perks to users who have higher social credit scores such as lower interest rate on loans, a waiver on deposits and discounts on certain purchases. Inversely, individuals with lower credit have privileges taken away like not being able to purchase plane tickets, higher interest loans and distrust from other users.

Differences from Sapien:

- The data is not stored on the Blockchain, rather, it is stored by the conglomerates that run the businesses.
- The score you receive on Sesame credit is not a P2P post transaction score, but a score based on certain dimensions that the entity sees fit to include.
- Sesame credit itself is not a cryptocurrency and works off data it collects from transactions of real world currency

3.2 Libra

While not officially launched yet, Facebook's Libra white paper has created ripples throughout many spheres such as Blockchain, cryptocurrency, online banking, international banks and more.

Libra is Facebook's very own Blockchain project which looks to on board more people, of whom have a smartphone and internet connection to utilize their cryptocurrency, because many of said people do not have access to any kind of online banking. It aims to make transfer of online currency almost free, simple and intuitive. Libra has stated that it wants to make sending money to a friend as easy as sending a message to a friend and will do this via their 'Calibra' app (a wallet for Libra). People will be able to trade in traditional Fiat Money and other real world currency for Libra and can spend, purchase or transfer Libra with the Calibra app.

This is somewhat similar to Sapien because:

- It is on the Blockchain
- It is user friendly and intuitive
- It is a cryptocurrency

Differences from Sapien:

- Does not provide an interface for users to rate and accumulate a rating post transaction to display as a badge of trust
- Price of Libra is tied to real world assets to prevent volatility
- A "Libra Association" has been setup to verify transactions, meaning that Libra is not a real Blockchain since a 3rd party entity has significant influence over the Blockchain, which can lead to a multitude of problems (government oversight, problems with trust)

3.3 Credit Rating Agencies

A credit rating agency is an agency that assigns a credit rating, which rates the debtor's ability to pay back a debt and the likelihood of that debtor defaulting on that debt. This data is used by banks to issue loans to individuals and implement certain terms and conditions based on your rating (e.g. lower interest rate if you have a high credit rating).

The only similarity to Sapien is that there is a rating that is assigned to you which affects the way your finances will be handled. That is where the similarities end.

Differences from Sapien:

- The data is not public and is typically b2b. The data will be sold to banks and other similar entities so that they can make decisions based on said data
- Data is not stored on the Blockchain
- Calculation of your rating is based on the credit rating agencies formula rather than a P2P system where other individuals you have completed a transaction with assigns you a rating based on their experience
- It is not a cryptocurrency, just an entity that assigns you a credit score

One final thing to note is that bank credit ratings are notoriously inaccurate. Sometimes the information that these ratings are based on isn't good and the projections are off.

It's not wise to disregard bank credit ratings completely, but it's also good to not view them as the only way to look at your banking institution. The one bank rating I would pay attention to is a junk rating. Usually, this means a bank is in a great deal of distress.

3.4 Businesses and Services that provide a rating post transaction

Like the title suggests, these are any businesses and services that gives users the option to rate the individual, business or entity they have just done a transaction with. The reason this option is becoming more and more popular with online purchases and transactions is to improve trust. If the individual, business or even the product or service is seen with more positive reviews and ratings, other customers would be more inclined to purchase from you.

Some examples are: Uber, TripAdvisor, Booking.com, Yelp, eBay and Google Reviews.

While these are by no means even close to direct competitors to Sapien, users may choose to look at the ratings on these companies and make their decisions based on their data rather than Sapien. This in a sense, creates competition - because customers may choose to rely on their data than Sapien's.

3.5 Venmo

Venmo is a mobile payment service owned by PayPal operating in the United States. Venmo account holders can transfer funds to others via a mobile phone app; both the sender and receiver have to live in the U.S.

Venmo is similar to Sapien in the sense that it is a very quick and easy way for people to send money to their peers with a user interface which is clear and simple. Also, Venmo offers the option for users to add comments to each payment, reminiscent of the rating users can give when using Sapien. Venmo wouldn't be considered a direct competitor, however, aspects of their business as well as the ease with which people are able to transfer assets may be a rival to Sapien.

Differences from Sapien:

- Venmo is not a P2P system to transfer money, rather a 3rd party entity that provides the platform and verification as well as owning all of the data
- Venmo does not provide a post transaction rating system that gives a score and therefore doesn't provide an indicator of trust like Sapien does
- As mentioned before, Venmo owns and stores all the user data. The data is not stored on the Blockchain
- Venmo only facilitates the transfer of real world money (in their case USD) rather than a cryptocurrency

Our advantages

- Sapien is a p2p system which means that it is fully decentralized
- Sapien doesn't own or store any kind of user data
- All data related to the transaction is stored inside the blockchain
- Transactions are made in cryptocurrency
- Sapien provides a post transaction, unique, personal, human rating system with proof of trust

4 Sapien app

4.1 Our Solution

Sapien assumes that there is no trust between human beings, whether it is your kids, parents, best friends or business partners. To build such trust we came up with a simple and effective solution - start rating and reviewing people after concluding a transaction. We built a multi-modal platform with a core module - Human Rating - an instrument to identify persons human capital score, but also a technology that will help people to become a better version of themselves.

While governments are trying to create an illusion of security by enacting data protection laws, the world, as well as the people, are still looking

for openness. People want to trust each other more, because the feeling of distrust is tiring and potentially costly in terms of money and time. Sapien is the key to transparent new open relationships.

Sapien's goal is to bring people together and to create a digital society built on trust, supported by global Sapien rating. We have developed a global ranking platform for every human and every business on our planet, that will create mutual benefits for all users.

Individual Users

How would you know who is standing in front of you? How would you understand if this school is the best choice for your child? Should you trust your savings to this bank? Do not believe the reviews on social networks - they have turned into a list of unnecessary news and marketing posts a long time ago. Now, we will extend digital instruments to which people are used to - like your friends in social networks, chat with them in messengers, and look for a real opinion about the person or business in Sapien.

With our application, users will together evolve towards digitally trusted society, receiving quality of life benefits as well as financial motivation. Here is only a brief list of privileges that digital sapiens will get:

Live in a digitally trusted society:

- The data collected by Sapien is revealing and offers valuable insight on individuals, it is a great tool for improving trust between two parties. However, it is not invasive. Your private data will only be shown IF it has been requested by someone else and you approve the request.
- After the transaction has been concluded, rate people you meet based on their merits and allow others to know who they deal with.
- The rating data is stored on the Sapien blockchain and is therefore immutable and cannot be tampered with by a third party. This makes your data secure and much more trustworthy.

Sapiens payment infrastructure:

- The fun and easy way to send, spend, and receive fiat money and cryptocurrency.
- Track all your non cash payments in one place, and split or share with other sapiens.

5 Fundamental rating principles

Sapien is a distributed ledger that provides trust between human beings by means of rating and reviews based on crypto transactions.

Rating and review system in details

In Sapien we identify two main entities: humans and a group of humans. By group of individuals we mean corporations, governments, political organizations, cooperatives, educational institutions and others. Rating of such entities includes the individual rating of all the people who take part in such organization.

All the entities have their unique name, rating and reviews information. Everyone can have one or more public.

Rating is a numerical representation of how an entity is perceived by others. With the lower limit of 0 and upper limit of 5, all entities start with 0. Rating can be given only by Sapien users in a transparent way and is not subject to any fraud.

Interaction between users is available after a transaction is delivered by one of the entities to another. After the transaction is done, a person or an organisation can rate and review another one with a grade from 0 to 5 and comment on such transaction.

And humans and business can give multiple ranks to one entity.

The rating of the person or business determines how strongly their grades affect other entities.

Multiple parameters determine final rating for each entity. To avoid users falling into minimum / maximum rating levels, complexity of rating change is not linear.

Sapien will keep all the rating algorithms available for examination by publishing them on the website and White Paper, to promote transparency and high ethical standards.

Over time, algorithms mentioned above will evolve or be modified, but our goal will still remain the same – create a global human rating system helping society to develop better merits and be friendlier towards each other.

There also could not be a single rating for everyone – people are complex creatures and have very different viewpoints on the world that surrounds them. We want to create a rating that will be meaningful for every single user.

Let us have a look at the example – say, a person may like road bikes, be popular and appreciated in his own company. While some other older

person will not share their passion and will want to give a negative rating for noisiness and dangerous lifestyle. We believe that both parties of this situation are equally right. When you look at a person or company rating in Sapien, you may see a total blended rank as well as separately – a rank from people that share similar opinion with you.

We achieve this by using cluster analysis and statistical clusterization in order to form groups of users by their convictions and ratings to common entities. You will be able to find out an opinion from someone who has a similar belief as you do. Just like you are recommended a new book or a movie on a website, you may also be recommended to visit a new organization or get in touch with a person that you would be interested in.

Sapien is available for all types of Businesses including corporations, governments, political organizations, cooperatives, educational institutions or any other that could be. Accounts for business are different in many ways in contrast with individual ones.

Rating based functionality - companies will discover new ways to interact with a customer in Sapien application, new functionality, and receive discounts for advertisement or data acquisition from Sapien:

Available from the start:

- Special offers for all users;
- In app image advertisement;

Medium rating:

- Special offers based on user rating; In app video advertisement;
- Light discounts on Sapien services.

High rating:

- Creation of events with minimum rating requirement;
- Push notifications advertisement; User data acquisition;
- Heavy discounts on Sapien services.

6 Architecture

6.1 Overview

Sapien - is the world's first, personalized, cognitive-based rating system with an integrated messenger and cryptocurrency wallet. A personal rating is assigned to network participants using transactions, taking into account feedback processed by algorithms based on a neural network.

6.2 Lightwallet

A cryptocurrency wallet is a system for sending / receiving transactions between network participants as well as selling / buying and secure storage of cryptocurrency assets.

The wallet has a separate menu tab with the following features: View the balance of cryptocurrency assets.

1. View the cryptocurrency rate.
2. View the address of the cryptocurrency wallet.
3. Formation of a new cryptocurrency wallet address.
4. Purchase of cryptocurrency.
5. Selling cryptocurrencies.
6. The implementation of the transfer of cryptocurrency.
7. Billing in the selected cryptocurrency.

6.3 Messenger

The messenger, as part of the social component of the project, allows network participants to exchange text and voice messages, as well as make video calls.

The messenger is integrated with a cryptocurrency lightwallet for the ability to quickly send / receive cryptocurrency (transaction) by simply selecting a contact from the contacts book.

Our messenger based on the Telegram source code and work in the Telegram cloud.[9]

6.4 Transactions

A transaction means any operation of sending / receiving cryptocurrency funds.

After successfully made the transaction, the parties involved are able to leave feedback about each other.

A transaction is considered confirmed after it has been successfully added to a new block in the main branch of the distributed registry.

6.5 Reviews

Feedback about each other can be left only by those network members who have committed a confirmed transaction between themselves.

The review consists of two components:

1. A numerical scale for the subjective assessment of the satisfaction of participants in a transaction with actions or services provided with predetermined questions about the service provided
2. A text box for directly writing a review.

Reviews are encrypted using an asymmetric encryption algorithm, signed by the owner and stored in a distributed, decentralized IPFS file system.

Each member of the network has the opportunity to provide or not to provide anyone (everyone) with access to any feedback about himself or any other personal information.

After a review has been successfully added to a decentralized file system for storage, it cannot be deleted or fixed in any way.

6.6 Personalized rating system

The personalized rating system is based on the use of cognitive technologies in the field of artificial intelligence, namely: natural language processing technology or Natural Language Processing (hereinafter - NLP).

In the context of the Sapien project, NLP is used to analyze and process text feedback left by network participants after transactions. The processed information is used to form a personalized rating by training the neural network, which means that in the future, the user may get service offers and services that most closely match his, personal, preferences. Also, the analysis

of text reviews is compared with the exposed, subjective, numerical assessment and, if, the degree of correlation of the results is within the acceptable difference - the rating is updated, otherwise, priority is given to the result of a text review analysis. If the text review is absent or does not carry a semantic load, the numerical assessment is taken into account. In a situation where there is no text review and numerical rating, the decision to update or not to update the rating can be made based on the transaction amount as follows:

Denote rating coefficient X as below:

$$X = \frac{\sqrt{S}}{R}$$

where

- S - sum of money in the transaction,
- R - max value for transaction rating.

Assign a positive transaction rating if

- If $5 > X \geq 3 \rightarrow$ transaction rates positively by 0, 125
- If $X \geq 5 \rightarrow$ transaction rates positively by 0, 25

Do not assign any transaction rating if $X < 3$

Rating system (rating) - is based on numerical component of the feedback and is the weighted average of all the numerical values of reviews for each transaction performed by the client or supplier. The weight of the transaction feedback depends on the amount of transferred money.

Let $F_i = (R_i, M_i, T_i)$ to be a feedback of the client in the transaction i . Here

- $R_i \in \{1, 2, 3, 4, 5, na\}$ is a number of points given by the client,
- $M_i \in \mathbb{R}$ is amount money in the transaction in \$,
- T_i is the text of the feedback.

Let's discard those transactions in which either $M_i < 1$ or $R_i = na$. Let's denote the remaining set of transactions as A .

Then total rating will be calculated as follows:

$$R = \frac{\sum_{i \in A} R_i \cdot \sqrt{M_i}}{\sum_{i \in A} \sqrt{M_i}}$$

6.7 Natural Language Processing

To process the text of reviews left in an arbitrary form, natural language processing technology is used.

Natural Language Processing (NLP) - natural language processing is a subsection of computer science and AI devoted to how computers analyze natural (human) languages. NLP allows the use of machine learning algorithms for text and speech.[1, 2, 3]

In the context of the Sapien project, NLP is used to train a neural network and thereby form a personalized rating based on an analysis of late reviews of services rendered (visited places, etc.)

6.8 Decentralization and data storage

Sapien built with a help of fully decentralized, opensource and secure platform – Textile.io. Textile provides encrypted, recoverable, schema-based, and cross-application data storage built on IPFS and libp2p. In other words, Textile can be treated as decentralized data wallet with built-in protocols for sharing and recovery, or more simply: an open and programmable cloud.

Textile is a set of tools and trust-less infrastructure for building censorship resistant and privacy preserving applications.

While interoperable with the whole IPFS peer-to-peer network, Textile-flavored peers represent an additional layer or sub-network of users, applications, and services.[8]

Textile based on Event Sourcing (ES) and Command Query Responsibility Segregation (CQRS) principals. ES – is a design pattern for persisting the state of an application as an append only log of state-changing events.[7]

CQRS– design pattern whereby reads and writes operations are separated into different models, using commands to write data and queries to read data.[6]

Key principal of ES and append-only logs is that all changes to application state are stored as a sequence of events. Because any given state is simply the result of a series of atomic updates, the log can be used to reconstruct past states or process retroactive updates. In other words, with minimal conformity, a single log can model multiple application states.

6.9 Data synchronization

To solve synchronization it is often helpful to handle updates on just the database and then provide the query and interfaces only later in a DBMS. One powerful approach to synchronization is to use a set of append-only logs to model the state of an object simply by applying its change sequence in the correct order. This concept can be expressed succinctly by the state machine approach: if two, identical, deterministic processes begin in the same state and get the same inputs in the same order, they will produce the same outputs and finish in the same state. This is a powerful concept baked into a simple structure and is at the heart of many distributed database systems.

Logs or Append-only Log.[5] A Log is a registry of database transactions that is read sequentially (normally ordered by time) from beginning to the end. In distributed systems, logs are often treated as append-only, where changes or updates can only be added to the set and never removed.

6.10 The Threads protocol

Threads[5] is a protocol for creating and synchronizing state across collaborating peers on a network. Threads offer a multi-layered encryption and data access architecture that enables datasets with independent roles for writing, reading and following changes. By extending on the multiaddress addressing scheme, Threads differs from other solutions by allowing pull-based replica synchronization in addition to push-based synchronization that is common in distributed protocols. The flexible event-based structure enables client applications to derive advanced application states, including queriable materialized views and custom CRDTs.[4]

6.11 Agent-centric Security

Agent-centric security[5] refers to the maintenance of data integrity without leveraging a central or blockchain based consensus. The general approach is to let the reader enforce permissions and perform validations, not the writer or some central authority. Agent-centric security is possible if the reader can reference local-only, tamper-free code or if the local system state can be used to determine whether a given operation (e.g., delete operation) is permitted. Many decentralized networks, such as Secure Scuttlebutt and Holochain, make use of agent-centric security. Each of these systems leverages cryptographic

signatures to validate peer identities and messages

6.12 How it works

Total rating and feedbacks will be shared across the network without the centralized control and users will benefit from lots of discounts or any other goods depending on your total rating number.

Threads – it is a datasets and consists from the logs of events (changes/updates). Because threads are simply a hash-chain of update messages, or blocks, they can represent any type of dataset. Some blocks point to off-chain data stored on IPFS. For example, a set of photos, a PDF, or even an entire website.

At the core of every thread is a secret. Only peers that possess the secret are able to decrypt thread content or follow linkages.

Blocks are the raw components of a thread. Think of them as an append-only log of thread updates where each one is hash-linked to its parent(s), forming a tree. New / recovering peers can sync history by merely traversing the hash tree.

In practice, blocks are small (encrypted) protocol buffers, linked together by their IPFS CID (content id or hash). You can explore the protocol buffer definitions [here](#).

Every Sapien peer start and maintain its own Main thread which is open and shared. Every **Main thread** of every peer consist of a blocks, each block is hash-linked to its parent and stores a hash from a blockchain transaction and a nested thread – **Review thread**.

Review thread – it is a thread which stores a global total rating value, rating value of transaction and a text feedback for this transaction. It consists from only one block which corresponds to transaction in blockchain. This thread is shared and read-only for every peer in the network.

6.13 Example of how the transaction and feedbacks made

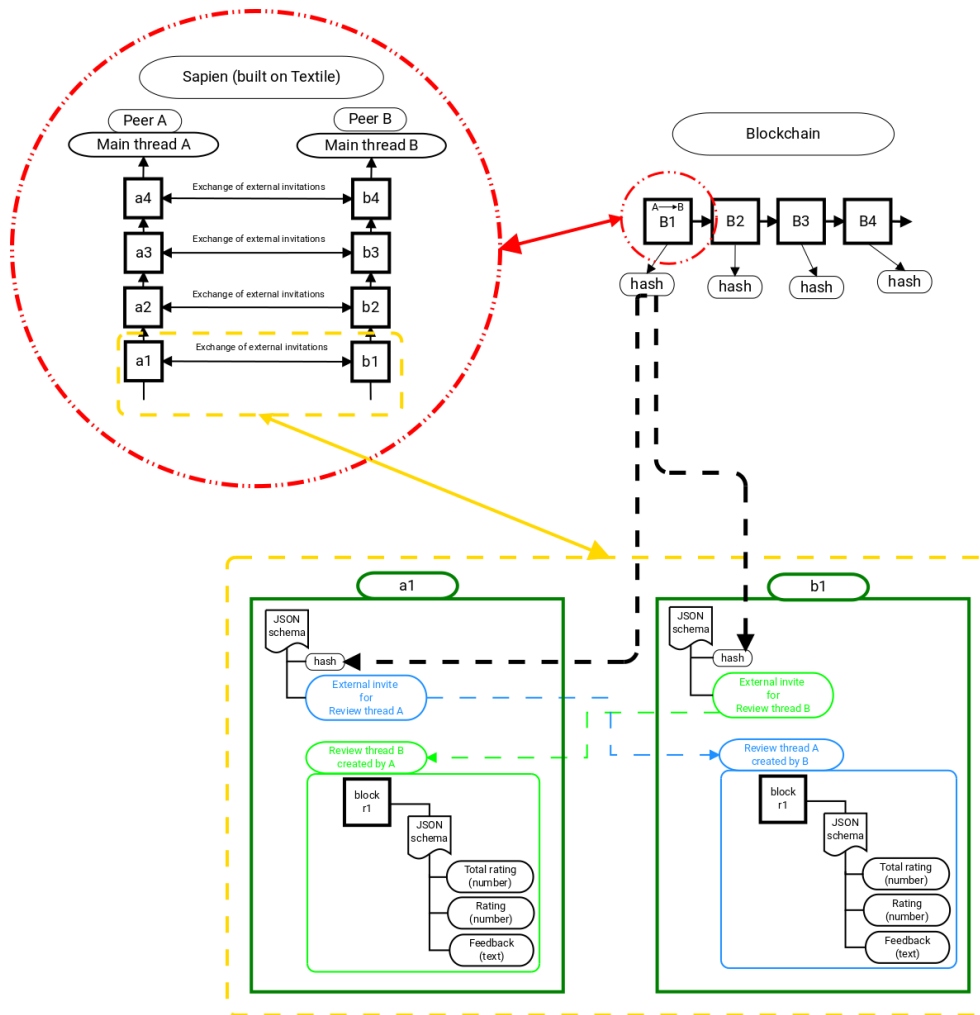
Imagine that user A make a transaction to user B by simply clicking on B inside his contact list and choose option to make a transaction, then enter desirable amount of coins and, if his balance is not negative and not less than the amount of transaction, A can transfer some amount of coins to B. Transaction will be made inside to blockchain, after transaction made, A can

rate and leave a feedback about B, B can also rate and leave a feedback about A. Rating and leaving feedbacks can rise or low a total ratings of user A or user B. Nevertheless, rating users (users - persons or businesses) and leaving feedbacks is optional, in the situation when no rating or feedback was left, rating updated s described above (see “Personalized rating system”).

Step-by-step example of how the rating and feedback are made:

1. 1.1. A sends an external invite of main thread A to B
- 1.2. B sends an external invite of main thread B to A
2. 2.1. A writes a hash of transaction into the json schema of the main thread B
- 2.2. B writes a hash of transaction into the json schema of the main thread A
3. 3.1. A creates review thread for B (read-only for B and others / shared / with external invite)
- 3.2. B creates review thread for A (read-only for A and others / shared / with external invite).
4. 4.1. A sends external invite for review thread of B to B
- 4.2. B adds external invite for its review thread to the json schema
5. 5.1. B sends external invite for review thread of A to A
- 5.2. A adds external invite for its review thread to the json schema
6. 6.1. A writes current rating value and feedback for B
- 6.2. A reads previous block of main thread B
 - 6.2.1. reads previous value of total rating of B
 - 6.2.2. adds rating value to previous value of total rating B
 - 6.2.3. writes updated value of total rating to the review thread B
 - 6.2.4. A sign a JSON object of review thread for B
7. 7.1. B writes current rating value and feedback for A
- 7.2. B reads previous block of main thread A
 - 7.2.1. reads previous value of total rating of A

- 7.2.2. adds rating value to previous value of total rating A
 - 7.2.3. writes updated value of total rating to the review thread A
 - 7.2.4. B sign a JSON object of review thread for A
8. 8.1. A checks correctness of newly updated total rating value by adding all rating values from all blocks of its review thread and compare it with the new value.
 - 8.1.1. If the new value is not correct → peer A should annotate this block with “incorrect value”
 - 8.1.2. Randomly choose peer for Total Rating Value recalculation
 - 8.1.2.1. If the value is the same → annotate block with the ”Correct”
 - 8.1.2.2. If the value is incorrect
 - 8.1.2.2.1. Recalculate new value
 - 8.1.2.2.2. Write a new block with predefined feedback: “Total value recalculated”
 - 8.1.2.2.3. Write a new Total rating value
 9. 9.1. B checks correctness of newly updated total rating value by adding all rating values from all blocks of its review thread and compare it with the new value.
 - 9.1.1. if f new value is not correct → peer A should annotate this block with “incorrect value”
 - 9.1.2. Randomly choose peer for Total Rating Value recalculation
 - 9.1.2.1. If the value is the same → annotate block with the ”Correct”
 - 9.1.2.2. If the value is incorrect
 - 9.1.2.2.1. Recalculate new value
 - 9.1.2.2.2. Write new block with predefined feedback: “Total value recalculated”
 - 9.1.2.2.2.1. Write new Total rating value



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