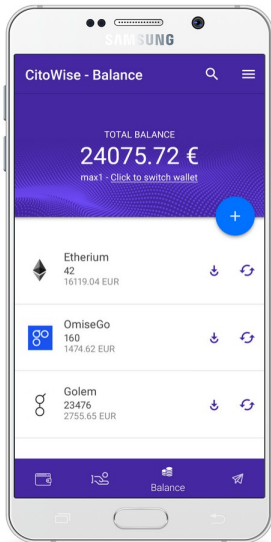


# Citowise – blockchain payment gateway

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Amount of ICO's is steeply growing every month, providing an outstanding opportunities for investors. Total cryptocurrency investments has greatly surpassed the venture capital, defining a new era in company funding campaigns. However the rapid development of field has left behind an important infrastructure aspects. Only technically proficient individuals can avoid common risks as well as avoid mistakes while setting up a simple transaction in blockchain. Technical solutions that are currently available for blockchains are far away from being ready to be integrated into everyday life. New cryptocurrencies that are issued during the ICO campaigns still has to figure out simple and reliable way to be transferred between customers leaving a huge playgrounds for enthusiast to cover this gap.

## Introduction

In the beginning of summer 2017 cumulative amount of investments raised during ICO<sup>1</sup> campaigns surpassed cumulative amount of venture capital investments[1] and continued to grow. Many strong teams, who were seeking for the way to fund their brilliant ideas, started investigating the attractive opportunity to launch their own campaigns. The ease of process of issuing a new cryptocurrency for their services on existing block-chain platforms and the perspectives of successful fundraising has attracted the attention of many.

A deeper look at ICO campaigns will reveal a large diversity of ways how one can utilize the tokens<sup>2</sup> but they all can be described with one simple phrase: an ICO campaign is a promise of creation of system where issued tokens will have value. A new system within which users can utilize tokens in exchange for an item, a service or in number of other ways.

Despite a steep growth in number of campaigns[2] and astronomical amounts that the most successful of them have raised[3] there is still a big problem that whole blockchain community is facing – there is no simple way to exchange obtained tokens between customers after the campaign is finished and to utilize them in exchange for value once the ICO project is up and running. The process of token transfer can be very complicated[4] despite the amount of transactions[5].

<sup>1</sup> Initial coin offering

<sup>2</sup> Token is base unit of cryptocurrency, issued during the ICO campaign. Tokens are governed by the smart contracts and do live on existing blockchain.

Almost every ICO campaign promise to deliver their own solution for token circulation while that increases technical complexity of an already ambitious goal that token issuers are aiming to solve. However, technical implementation of tokens from project to project does not disperse a diversity, at least for Ethereum platform<sup>3</sup>, the platform of choice for vast majority of ICO campaigns[2]. Every token issued on Ethereum platform has to follow an interface described by ERC20<sup>4</sup> standard. This standard ease the integration of tokens into 3-rd party software, however a deep technical understanding of smart contracts<sup>5</sup> and blockchain technology is still required to provide secure and efficient way for token circulation.

### Share Of ICO'd Assets Built on The Ethereum Blockchain

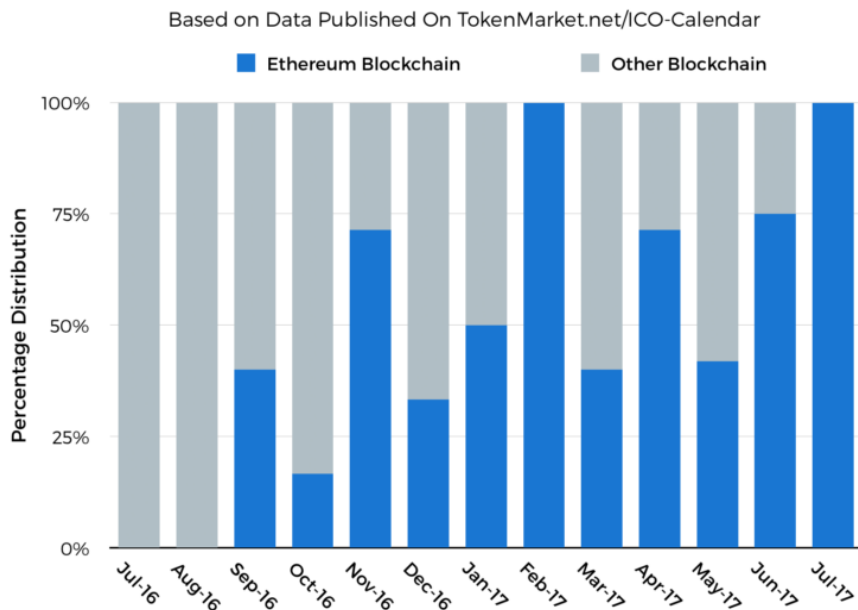


Chart 1. Share of ICO'd assets build on the Ethereum blockchain by months[2]

Market analysis has shown that available at a moment products do not provide an easy and convenient way<sup>6</sup> neither for peer-to-peer transactions<sup>7</sup> nor business payments<sup>8</sup> that can be used by an any, even non-proficient in blockchain person. Therefore, solution for this problem is one of the major milestones of the Citowise's roadmap - simplifying token usage in everyday life and increasing cryptocurrency turnover across the globe

The Citowise<sup>9</sup> main target is to provide secure and convenient solution to simplify token payment processes, speed up the adoption of crypto-payments into everyday life and keep the control of funds solely in user hands. This solution is based on 2 corner stones that have

<sup>3</sup> The blockchain platform, that provides implementation of smart contracts

<sup>4</sup> [https://theethereum.wiki/w/index.php/ERC20\\_Token\\_Standard](https://theethereum.wiki/w/index.php/ERC20_Token_Standard)

<sup>5</sup> Smart contract is a script defined on the blockchain that governs the behavior of tokens

<sup>6</sup> There are payment gateways for cryptocurrencies but either they do not target ERC20 tokens or they do not provide a convenient way for transfer

<sup>7</sup> Person to person

<sup>8</sup> Payment gateway usually covers a payment solution for mobile and web

<sup>9</sup> Company incorporated in

to be achieved: a secure mobile and desktop wallets as well as payment gateway based on smart contracts. Citowise wallet is free product, accessible and available to all users over the globe for no charge or any other fees.. For business customers there are available services like web payments gateway, in-app purchases, donation payments for charities, game streaming services and many other utilities.

## Peer-to-peer transactions

Amount of Ethereum transaction is steadily growing and by the time of this paper it was fluctuating around 400k[5] transactions a day or ~4.5 transactions a second. Still Ethereum has a large potential for scalability and can theoretically handle up to 270 transactions per second in its current implementation[6] which is 24 million of transactions per day.



Chart 2. Amount of transaction processed through Ethereum blockchain on daily basis

However it is still technically impractical to send tokens or coins from account to account or to pay for service or goods to online merchant with solutions available on the market. Current desktop wallets expect user to download the whole blockchain to local machine and only then user will be let to broadcast his first transaction. Blockchain data sizes are far from being small and at the time of this article Ethereum full node size was about 63 gigabytes[7] and geth<sup>10</sup> with full achieve synced was almost 300 gigabytes[8].

Ethereum is not the only option when it comes to cryptocurrencies. There are around 900 public blockchains operating worldwide with dozen of them being a major player on this field.

<sup>10</sup> Ethereum protocol implementation written with Go language

Each one of them expects user to download many gigabytes of data before the very first transaction can be sent. There are no doubts that such situation is a major barrier that blockchain community has to overcome in order for cryptocurrencies to become widely accepted in society's life. The first solution that one can think of is to provide a wallet that vanishes technical complexity of blockchains and that reduces user interaction with them to general purposes – send, receive and check balance.

There are many wallets available on the market, which provide an impressive set of functionality. All of them can receive, transfer and store cryptocurrencies in a secure way, observe crypto-market and exchange rates, speculate on cryptocurrency stocks, convert cryptocurrencies through exchanges, participate in ICO and many more. However, there is yet no convenient and easy-to-use wallet that focuses on user experience, user interface and still provides a user-friendly way to transfer tokens and coins. That especially concerns seamless payments in e-commerce and in-app sectors, which would be convenient for both parties - client and business.

Citowise provides free wallets for Desktop, Google Android and Apple iOS platforms which can transfer all ERC20 tokens out-of-box and dozens of the largest cryptocurrencies. Top priority is to store wallets in a secure way, so that nobody except the wallet owner can access them - wallet safety and security are the most important prerequisites to all provided solutions. Citowise's next priority is to make the wallet usable by everybody regardless of their technical understanding of blockchain principles.

Security and convenience are defining ingredients for a good wallet, however, feature-rich functionality is also required. Citowise wallet provides such features as - integrated exchange, import and backup, transaction history, incoming transaction notifications and of course integration with all other Citowise solutions. As a result, all that makes the wallet very accessible and convenient for an everyday use, covering many user needs and demands - from peer-to-peer transactions and e-commerce to in-app integrations.

## **Web payments gateway**

E-commerce became de-facto standard model for retail industry. Annual reports are outlining fascinating tendencies of online sales growth and predictions depict an even better image. Only in Europe the online turnover in 2016 was reported to be €530 billion and was forecasted to become €602 billion in 2017[9]. For the whole world those numbers are even more impressive and volume of e-commerce is expected to reach \$4 trillion dollars by 2020[10].

There are myriad of companies providing solutions for payment processing who target primarily online commerce. Majority of online purchases are going through credit-card service providers such as Visa, American Express, Master card, etc[11].

One can go with a highly reliable payment solution which already had earned good reputation through the years that would charge less than 2% plus transaction fee in the best case

scenario<sup>11</sup>. However it is not always possible to provide online payment solution with below 2% charge rate for all credit card systems. Major credit card systems fees are slightly beyond that<sup>[12]</sup> leaving on-line processing systems with tough decision to raise service fee to even higher degree<sup>12</sup>.

Traditional payment systems are convenient tool for online merchants who are selling things to local or regional customers, however they are not tailored well for businesses operating solely in digital space<sup>[13]</sup>. Music, videos, e-books, online trainings, games and other digital goods or services are often victims of chargeback fraud<sup>13</sup>.

On the other hand growing amount of ICOs have generated hundreds of digital currencies for their yet to be delivered products. Discovery and development of a solution that brings trust, simplicity and efficiency to financial systems which use those currencies in convenient and agile way is an ambitious goal which Citowise strives to achieve by providing set of well integrated products that cover the most of use-cases that markets are tackling in day-to-day work. Fortunately, cryptocurrencies issued on Ethereum blockchain implement identical behavior and circulation problem while being solved once can be provided as a solution for all of them. This will save time and effort of developers to deliver fully functioning product to the market. However, there are many other problems to resolve such as - seamless integration into external products, secure and efficient workflow, user-friendly and highly accessible financial applications, as well as scalability over different type of blockchains.

Citowise solution for this segment is an operating payment gateway oriented for selling digital goods and services in exchange for cryptocurrencies, such as Ether, Bitcoin, Litecoin, Ethereum and other blockchain based tokens. Current estimated margin is less than percent, which makes it one of the cheapest solutions on the emerging market. Thus, Citowise aims to acquire strategical position, delivering payment solution, where transaction will be processed through a specifically designed for merchant needs smart contract, which will facilitate payment process, at the same time keeping both parties in full control over their funds and neither regulating nor influencing their interaction.

Moreover, Citowise is not placing any constraints on end-customers in terms of what software to use to initiate payment, leaving the choice of preferred wallet to user's personal preference. However, as Citowise wallet provides much better user experience due to its tight integration with all products involved into the solution it is advised as a preferred choice.

## In-app integration

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<sup>11</sup> Braintree, a credit card processing company owned by Paypal, offers a very liberal pricing strategy such as 1.9% + 30 cents per transaction for all credit card payments except for American express

<sup>12</sup> Braintree, a credit card processing company owned by Paypal, charge rate American express credit cards is 2.9% + 30 cents per transaction

<sup>13</sup> Chargeback fraud, also known as friendly fraud, occurs when a consumer makes an online shopping purchase with their own credit card, and then requests a chargeback from the issuing bank after receiving the purchased goods or services. Once approved, the chargeback cancels the financial transaction, and the consumer receives a refund of the money they spent. When a chargeback occurs, the merchant is accountable, regardless of whatever measures they took to verify the transaction

Monetization of mobile applications is among of main concerns for mobile developers. There are numerous companies which already provide a strong solutions for this sector[14] with large majority of them focusing primarily on fiat payments and cryptocurrencies barely have any presence of this 200 billion dollar market[15].

Despite the volumes and tough competition this market can scarcely boast about low fees. Payment margins start at somewhere around 30%[16] and usually are around 50% to 75%<sup>14</sup>. One can reasonably argue about the fairness of commission charged by application venues, but there can hardly be any reasonable explanation given to margins charged by telecom[17] companies.

The opportunities that blockchain based payment solutions provides, with its insignificantly lower payment margins that no fiat based payment system can ever ever afford, opens an outstanding perspectives to the future of mobile payments.

Citowise target on this frontier is to provide easily integratable set of libraries for existing mobile platforms, such as Google Android and Apple iOS. The main focuses are: simplicity and convenience of user experience for end-users, fast and pain-free integration process into existing application, compatibility with other payment providers and not the least revenue analytics for mobile publishes and developers.

The value that Citowise solution will provide to mobile businesses is first of all a full individual control of earned funds<sup>15</sup>, a zero landing fee, unprecedentedly lower margins compared to any other payment methods<sup>16</sup> and pain-free integration process which will let developers to concentrate on adding value for their customers rather than wasting precious resource investigating an integration opportunities with blockchain payments by themselves and a choice of accepted cryptocurrencies, whether it is an existing coins such as Ether, Bitcoin, Litecoin or tokens issued during ICO campaign.

On the other hand, Citowise will not place any constraints on end-customer's payment preferences, leaving the choice of payment origin procedures solely up to payee. Citowise in-app payments will also not inflict any additional fees on application customers and will ensure to provide simple and convenient payment process.

## Charity donations

One should never forget that it is human fundamental demand to provide help to those who got into great demand against the odds. Nowadays available options for society members to help those who are in demand are represented mostly by telecom premium services, crowd funding platforms and bank transfers/recurrent payments.

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<sup>14</sup> Pricing rates are carefully kept in secret by payment providers and sent to clients on per request basis. There is a very insufficient amount of information available publicly.

<sup>15</sup> Which is based on smart contracts concept and will eliminate a need for trusted 3-rd party supervisor

<sup>16</sup> One can expect fees to be even lower than 1%



Telecom providers who provide premium services for donation and charity purposes are charging somewhere around 7-9%<sup>[18]</sup> as a service fee and can it get raised funds be delayed by upto 90 days<sup>[19]</sup> which can often be outside of viable timeframe. One should not doubt that funds withheld by telecoms and charity services, who can charge additionally around 7%<sup>[20]</sup>, worldwide could have helped charity organizations to concentrate on their straight targets rather than dispersing their financials on service providers and would have saved more lives of those who was in demand for a vital service.

Citowise aims to adhere the situation by providing its customers with a simple setup for donation campaigns, optimized for donors experience, targeting worldwide, adoption of campaigns for social networks and exposing selected donation campaigns to Citowise wallet customers. This campaign can be present to contributors in form of QR code printable on paper or any paperless format or given to donors as a url.

Citowise will provide the lowest charges among all available donation service providers which one can expect to be even lower than 0.5% and possibly less.

## Security

Security is always primary focus of any financial system. The first target for any attack is usually a centralized fund holdings whereas the booty can be outstandingly high<sup>[21]</sup>. Another target for an attack is the fund transfer mechanism. There is no doubt that interfering with such channels is among main concerns for malicious user as it can be highly rewarding<sup>[22]</sup>. Last major vector for the attack is wallet storage<sup>[23]</sup>. An experience of compromised local fund storage can be shocking for wallet owner<sup>[24]</sup>.

Citowise is aware of all those problems and takes security very seriously. Citowise payment gateways implement a decentralized product pattern and has no central funding storage. This parent does also rainises all business customers concerns about company security. All the funds are stored either in designated smart contracts, in case if the blockchain protocol allows it, or quickly released to merchant once there is any valuable amount achieved. Unfortunately, smart contract concept is not available for every blockchain, however there are authority projects that are aiming to cover this gap<sup>[25,26]</sup>.

On the other hand, Citowise wallet never send backup phrases or private key to any server or other device via digital means. The only exception is process of backup performed by wallet owner and is accompanied by corresponding security warnings. Such sensitive information is stored on a device in encrypted format and is protected from unauthorized access. Citowise can guaranty the security of wallet to be at least the same as the level of OS it is operating on<sup>[27]</sup>. Future roadmap plan includes integration with hardware wallets where Citowise wallet will be able to safely operate even on compromised or rooted device.

Citowise company main principles is to never interfere with customer funds or to lower the time of such interference in cases where blockchain protocols or available trusted tools does not provide the other.

## Conclusion

Transfer charge rates that can be achieved by blockchain based payment solutions are significantly lower than any fiat based payment system can ever afford. The transaction time between end-user and business can be decreased to couple of minutes or for some blockchains even to seconds.

Being limited only by blockchain fundamental constraints Citowise payment platform has a huge potential to grow. Relying on transparent smart contracts concept and relieving the need for 3<sup>rd</sup> party trust between end-user and service provider while still preserving the security and transparency of transactions. Citowise team is proud to provide solution that can revolutionize the concept of online payment processing. Saving the time and resources for engineers to deliver payment solution for their cryptocurrencies to establish the operation of their ideas Citowise facilitate the delivery of high quality products to society and strengthen expectations of ICO investors.

Another great target that Citowise will be proud to bring a solution for transfer between fiat and crypto-payments[28]. This problem currently is attacked by many blockchain enthusiasts around the world and is among top priorities on the way to adopt cryptocurrencies into everyday life.

Currently, there are barely any competitors on this market with niche positions being yet available. Mobile games, music players, video streaming and many other kinds of services which providing digital content or intellectual property will largely benefit from fast, cheap, reliable and transparent payment platform.

Moreover, blockchain based payments are moving the society further in progress erasing an artificial and rudimentary boundaries defined to be financial systems and regulators bringing it further. It is a step towards the new world based on principal of personal privacy, oriented to needs of society whereas every person has a freedom of money, man-in-the-middle roles are neglected and transparency of institutes and services is a given. Citowise will be proud to deliver such qualities to people and to be a part of this future.



## References

1. ICO Investments Pass VC Funding in Blockchain Market First - CoinDesk [Internet]. CoinDesk. 2017 [cited 2017 Oct 5]. Available from: <https://www.coindesk.com/ico-investments-pass-vc-funding-in-blockchain-market-first/>
2. Rowley J. How Ethereum became the platform of choice for ICO'd digital assets [Internet]. TechCrunch. 2017 [cited 2017 Oct 5]. Available from: <http://social.techcrunch.com/2017/06/08/how-ethereum-became-the-platform-of-choice-for-icod-digital-assets/>
3. hungdotcom, dailypoetry. [ICO] Top 10 ICO's by USD raised 2017 — Steemit [Internet]. Steemit. 2017 [cited 2017 Oct 5]. Available from: <https://steemit.com/ico/@hungdotcom/ico-top-10-ico-s-by-usd-raised-2017>
4. Newbium. Receive & Send Ethereum Tokens - myetherwallet.com • Newbium [Internet]. Newbium.com. [cited 2017 Oct 5]. Available from: <https://coins.newbium.com/post/2582-receive-send-ethereum-tokens-myetherwallet-com>
5. etherscan.io. Ethereum Transaction Growth Chart [Internet]. [cited 2017 Oct 5]. Available from: <https://etherscan.io/chart/tx>
6. How do I compare the “scalability” capabilities between ethereum and bitcoin? [Internet]. [cited 2017 Oct 5]. Available from: <https://ethereum.stackexchange.com/questions/3308/how-do-i-compare-the-scalability-capabilities-between-ethereum-and-bitcoin>
7. Bitcoin, Litecoin, Namecoin, Dogecoin, Peercoin, Ethereum stats [Internet]. [cited 2017 Oct 5]. Available from: <https://bitinfocharts.com/>
8. etherscan.io. Ethereum ChainData Size Growth - Full Sync [Internet]. [cited 2017 Oct 5]. Available from: <https://etherscan.io/chart/chaindatasizefull>
9. European Ecommerce Report 2017 - Ecommerce continues to prosper in Europe, but markets grow at different speeds - Ecommerce Europe [Internet]. Ecommerce Europe. [cited 2017 Oct 5]. Available from: <https://www.ecommerce-europe.eu/press-item/european-ecommerce-report-2017-released-ecommerce-continues-prosper-europe-markets-grow-different-speeds/>
10. Thumm J. Global E-commerce Sales to Approach US\$2 Trillion in 2016 - Power Retail [Internet]. Power Retail. 2016 [cited 2017 Oct 5]. Available from: <http://www.powerretail.com.au/news/global-ecommerce-sales/>
11. Global ecommerce payments guide [Internet]. www.adyen.com. [cited 2017 Oct 5]. Available from: <https://www.adyen.com/dam/jcr:5c0ddde5-fb5b-40bf-969d-81a23e5ce958/Global%20ecommerce%20payments%20guide.pdf>
12. The Nilson Report [Internet]. www.nilsonreport.com. [cited 2017 Oct 6]. Available from: [https://www.nilsonreport.com/upload/issues/1109\\_6392.pdf](https://www.nilsonreport.com/upload/issues/1109_6392.pdf)
13. Harvey K. Friendly Fraud vs. Chargeback Fraud: Knowing the difference is paramount [Internet]. Chargify Blog. 2016 [cited 2017 Oct 5]. Available from: <https://www.chargify.com/blog/friendly-fraud-vs-chargeback-fraud/>
14. Velji J. 10 Ways to Effectively Monetize Your Mobile App [Internet]. BuildFire. 2016 [cited 2017 Oct 5]. Available from: <https://buildfire.com/ways-monetize-mobile-app/>
15. Mobile app revenues 2015-2020 | Statistic [Internet]. Statista. [cited 2017 Oct 5]. Available from: <https://www.statista.com/statistics/269025/worldwide-mobile-app-revenue-forecast/>
16. Mackenzie T. App store fees, percentages, and payouts: What developers need to know

- [Internet]. TechRepublic. [cited 2017 Oct 6]. Available from: <http://www.techrepublic.com/blog/software-engineer/app-store-fees-percentages-and-payouts-what-developers-need-to-know/>
17. Balanarayan NT. Carrier billing service Mopay launches operations in India - MediaNama [Internet]. MediaNama. 2014 [cited 2017 Oct 5]. Available from: <https://www.medianama.com/2014/05/223-mopay-carrier-billing-india/>
  18. Charitable Giving Via Your Cell Phone: Is the Convenience Worth It? [Internet]. www.charitywatch.org. [cited 2017 Oct 5]. Available from: <https://www.charitywatch.org/charitywatch-articles/charitable-giving-via-your-cell-phone-is-the-convenience-worth-it-70>
  19. Gannes L. Haiti Text Donation Campaigns Face 90-Day Delays [Internet]. 2010 [cited 2017 Oct 5]. Available from: <https://gigaom.com/2010/01/14/haiti-text-donation-campaigns-face-90-day-delays/>
  20. Top 12 Text-to-Give Services for Nonprofits [Internet]. Double the Donation. [cited 2017 Oct 5]. Available from: <https://doublethedonation.com/nonprofit-software-and-resources/text-to-give-tools-for-nonprofits/>
  21. The curious case of the missing Mt. Gox bitcoin fortune - CyberScoop [Internet]. Cyberscoop. 2017 [cited 2017 Oct 5]. Available from: <https://www.cyberscoop.com/bitcoin-mt-gox-chainanalysis-elliptic/>
  22. McMillan R. \$1.2M Hack Shows Why You Should Never Store Bitcoins on the Internet [Internet]. WIRED. 2013 [cited 2017 Oct 5]. Available from: <https://www.wired.com/2013/11/inputs/>
  23. Easy extraction of the Jaxx 12-word wallet backup phrase. [security, exploit] • r/jaxx [Internet]. reddit. [cited 2017 Oct 5]. Available from: [https://www.reddit.com/r/jaxx/comments/6gfl4d/easy\\_extraction\\_of\\_the\\_jaxx\\_12word\\_wallet\\_backup/diq8cs2/?st=j8d2sgpd&sh=bd263817](https://www.reddit.com/r/jaxx/comments/6gfl4d/easy_extraction_of_the_jaxx_12word_wallet_backup/diq8cs2/?st=j8d2sgpd&sh=bd263817)
  24. Users Report Losing \$400,000 Due to Jaxx Wallet Vulnerability [Internet]. CryptoCoinsNews. 2017 [cited 2017 Oct 5]. Available from: <https://www.cryptocoinsnews.com/users-report-losing-400000-due-to-jaxx-wallet-vulnerability/>
  25. What is Rootstock [Internet]. CryptoCompare. 2016 [cited 2017 Oct 6]. Available from: <https://www.cryptocompare.com/coins/guides/what-is-rootstock/>
  26. RSK [Internet]. RSK. [cited 2017 Oct 6]. Available from: <http://www.rsk.co/>
  27. Homakov E. Why you shouldn't worry about the "Jaxx hack" – Egor Homakov – Medium [Internet]. Medium. Medium; 2017 [cited 2017 Oct 5]. Available from: <https://medium.com/@homakov/why-you-shouldnt-worry-about-the-jaxx-hack-6344a4c4a11>
  28. Is Blockchain Ready for Fiat? Why Banks See Big Promise in Crypto Cash - CoinDesk [Internet]. CoinDesk. 2017 [cited 2017 Oct 5]. Available from: <https://www.coindesk.com/blockchain-ready-fiat-banks-see-big-promise-crypto-cash/>