Humaniq Whitepaper

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Abstract

The Humaniq team is building a next generation model for financial services (Banking 4.0) which is based on Blockchain technology, mobile devices and biometric identification systems. We will use cryptofinancing (Initial Coin Offering) for growth capital rather than traditional venture capital and shareholders.

Our aim is to empower a market of 2 billion people who currently don't have access to banking across the world. Almost half the world — over three billion people — live on less than $2.50 a day. At least 80% of humanity lives on less than $10 a day. More than 80 percent of the world's population lives in countries where income differentials are widening.

We believe Humaniq can help reverse these trends and help bring people out of poverty by giving them banking tools that can provide liquidity for entrepreneurial ventures via loans, investment, online work and cryptofinancing as well as create new opportunities in the digital economy, locally, nationally and internationally. Humaniq can also help mitigate the refugee crises occurring in many countries in the West due to economic disparity and lack of opportunities in emerging economies.

Our unique selling proposition (USP) in the digital banking market is our use of Blockchain technology combined with biometrics and a focus on mobile technology. We plan to not only provide a software solution but also bring mobile hardware (phones) into the markets we are aiming for in Africa, Asia and South America.

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1 Mission

"A small body of determined spirits fired by an unquenchable faith in their mission can alter the course of history."
Mahatma Gandhi

Look at this map:



Figure 1: indeed, where they are?..

You may notice: there are *unbanked* regions on Earth. As a matter of fact, nearly 2.5 billion people live in regions where no banking infrastructure exist. The only form of payment available in those regions is manually giving banknotes (and/or coins) to a counterparty.

What makes it worse, even in banked regions, there are millions of people without passports or any other forms of identity or documentation, thus they are cut off from modern banking facilities. According to a recent World Bank estimate, the total number of people who did not have identification documents amounted to 1.5 billion by 2016.

We at Humaniq, will provide a new financial infrastructure for everyone who has a smartphone with a camera. The smartphone is necessary to make and receive payments, and the camera is needed to earn the first coins. The price of smartphones is falling every year and they are currently priced at between $10-$20 on the low end.

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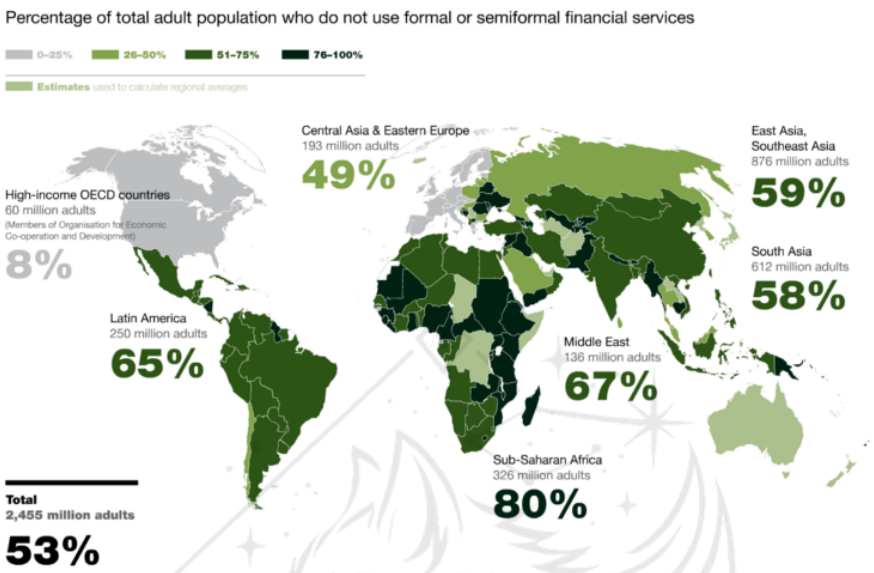


Figure 2: 2.5 **billion** adults are unbanked

To put it in simple words, Humaniq is *banking for the unbanked*. Our ultimate goals are:

- ➤ to integrate 2.5 billion people disconnected from the international business community, and empower them to free themselves from the chains of poverty,
- ➤ to shift emerging economies into the cryptoeconomy.

2 What makes Humaniq special?

"The biggest room in the world is the room for improvement."

Helmut Schmidt

It is natural to ask why the problem of banking for the unbanked cannot be solved by Bitcoin or any other cryptocurrency. And the questions can also be asked: «What makes Humaniq special?», «Are you just another startup offering yet another mobile wallet app?»

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At first glance, it looks like any Bitcoin mobile wallet could be used in unbanked regions. But if you think deeper about this, you will discover the following issues:

✘ **The problem:** the number of satoshis in circulation (or any other small units of crypto) is insufficient for some regions. E.g., in Indonesia (250 million people), there's just not enough digital currency to have substantial daily turnover (volume). Bitcoin is scarce, and if you don't have bitcoins, you are inclined not so to be interested in the network. For regions poorly integrated into the international financial system, it would take a lot of time for sufficient liquidity to appear in the local market. But there's no doubt that such regions have their own domestic economy *today*. It's just they are almost exclusively cash-based.

✔ **Our solution:** unlike other cryptocurrencies, Humaniq provides an *egalitarian* emission mechanism. *The amount of coins that one person can mint is limited*, and this is what makes Humaniq so special. This mechanism has nothing to do with competing in specialized hardware, having access to specialized hardware, wasting electricity, or owning the coins preliminarily. It may be called *proof-of-face*, and nothing is more fair than that.

✘ **The problem:** the lack of local exchanges. Even now in 2017, there are lots of countries where no infrastructure to buy or sell cryptocurrency exists. This is the issue even for some European countries, which have no problems with Internet adoption and where virtually the entire population is using smartphones. We'd like to stress that it has been more than 8 years since the first cryptocurrency launched, and more than 7 years since the first cryptocurrency exchange ever appeared.

✔ **Our solution:** since our platform provides infrastructure for people to earn Humaniq coins from home, we understand that people would eventually like to exchange cryptocurrency for local currency. Of course, we provide such infrastructure in our app. (And still, we are in talks with some national and international shopping franchises in various countries we are targeting — and engaging them to add Humaniq as a payment option.)



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✘ **The problem:** some states are concerned with pseudo-anonymity of cryptocurrencies, which causes recurring legal issues associated with them.

✔ **Our solution:** since app users have to pass bio-identification, there is no anonymity in Humaniq. That is good news for transparency advocates, and that makes Humaniq unviable for financing terrorism, trading drugs and all the other deadly sins Bitcoin is accused of. Another point is, Humaniq provides the ability to earn while working from countries abroad. This enables an export-driven economy in depressed regions, improves living standards of depressed regions, and reduces the impetus for migration, which is great for all governments both in developed and in developing countries.

✘ **The problem:** the network effect of Bitcoin (and other cryptocurrencies) is relatively small because of relative usage complexity. According to the report from Juniper Research, the number of active Bitcoin users around the world could reach 4.7 million people by the end of 2019. Even now the network has reached the capacity limit of 250 thousand transactions. Eight years of the Bitcoin era have passed; compared to PayPal, after 8 years it had 100 million active accounts, despite the fact that it appeared with less developed online infrastructure and can require passport details for use.

✔ **Our solution:** we discarded the private and public key approach, which confuses newcomers; we also had to reject using fractional amounts of coins, since decimal fractions may be uneasy for people with little or no education. It's very simple. Coins are whole numbers (integers), faces are used as passwords — if you think it gets any easier than that, please tell us what could be simpler.

✘ **The problem:** complexity of reputation accounting in anonymous communities, needed for various p2p-solutions (p2p-insurance, p2p-banking).

✔ **Our solution:** we handle this problem with our *bio-identification* procedure. By the beginning of 2017, elegant solutions for biometric authentication already exist. If we take a combination of authentication



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methods it increases the likelihood of a near hundred-percent authentication.[1] Our approach is to use one random authentication method each time. Every authentication takes no more than two seconds and is as easy as unlocking a smartphone.

✘ **The problem:** the lack of crypto evangelists in undeveloped regions, which contributes to people's unawareness of innovative payment systems.

✔ **Our solution:** the reasons why people don't promote cryptocurrencies in undeveloped regions are understandable: technical complexity of the subject, language difficulties, no financial incentive etc. But we've targeted our project directly at such regions. Working on the problem, we have studied nearly everything about the current state of developing countries. We talked to ∼100 prominent bitcoiners who live in developing countries such as Sierra Leone, Afghanistan, Botswana, Pakistan and Indonesia. Dozens of them decided to enter our Humaniq Ambassador Program: they will teach people about how to use Humaniq and earn cryptocurrency for that.

This is why Bitcoin or any other crypto isn't used in unbanked regions. And won't be used. The currency of unbanked regions (the dark ones on Figure 1) is called Humaniq.

3 Vision

"Visions are worth fighting for. Why spend your life making someone else's dreams?"
Tim Burton

In Humaniq, the amount of coins that one person can mint is limited, and that is what makes Humaniq truly special.

This may sound really strange for an experienced crypto-community member. How did we achieve this?

We did it with the help of *bio-identification*. Our bio-identification has to be passed only once, taking less than 20 seconds and does not require to have any e-mail or passport. And modern face recognition algorithms for neural networks can check one's identity with incredible accuracy.

[1] It is worth noting that the use of hardware solutions, for example, a fingerprint scanner, allows signal counterfeiting at hardware level.

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Briefly, bio-identification is obligatory to create a wallet; *every user is given coins for passing bio-identification*; the process consists of taking series of photos, recording videos of the user making facial gestures, and recording the user's speech. For details, move to subsection 9.3.

To prevent theft of coins, every time a user signs in into the app, he or she must pass the authentication procedure. The authentication is similar to bio-identification, but much shorter: the user has to repeat just one of the recorded gestures in the front of the camera. It is as easy as unlocking a smartphone.

The software we have developed works with the cheapest hardware solutions on Android 5.0: with smartphones that cost $10-$15. Such affordable devices are usually fitted with a front-facing camera and microphone, and thus are sufficient to install a mobile wallet and to authenticate the user.

After passing the bio-identification, everyone is invited to earn additional coins by inviting friends and making transactions. Moreover, *we enable the possibility for everyone to earn a living with their mobile phones*, and that's what is truly impressive.

You may ask — how? Well, we work with local companies and brands to achieve this. Our cherished will is to make Humaniq the *de facto* currency of the world where over three billion people live on less than $2.50 a day.

Humaniq can give these people the opportunity to break free from poverty, improving the lives of their families and themselves by entering and helping create a new mobile digital economy. Imagine now... over two billion users improving capitalization of popular services by getting used to them — isn't that what brands dream of? Isn't that why Facebook is making a play with internet.org?

Our user may purchase a smartphone perhaps even with a loan — and after the purchase, cover his or her expenses within several weeks, by executing simple actions.

4 Emission Model

"Cryptoeconomic system may contain its own currency and token system which would be useful in any sense in some system aspect. Units of currency can be generated by the system and then sold or distributed directly as award for participation in system operation."

Vitalik Buterin

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We feel honored to repeat it once more: Humaniq provides an *egalitarian* emission mechanism. ***The amount of coins that one person can mint is limited***, and that is what makes Humaniq so special.

This mechanism has nothing to do with competing in specialized hardware, having access to specialized hardware, wasting electricity, or owning the coins preliminarily. It may be called *proof-of-face*, as we've mentioned, and there's nothing more fair than that.

In this section, we are about to present the details of the emission model we chose. Developing it, we pursued the following objectives:

1) The early adopters should receive more money than the later ones.
2) The total amount of coins that will ever be issued must be five times bigger than the amount of coins issued via Pre-ICO + ICO.
3) Emission proceeds until $k_{\max}$ people are registered. $k_{\max}$ should be relatively big.
4) In average, one user is granted with 500 coins.
5) Tokens are issued by the smart contract upon request.
6) Emission per one person is carried out not by one-time payment[2], but in accordance with a scoring function which depends on the person's activity: passing through bio-identification, inviting friends, making transactions.

Let $E(k)$ be the amount of HMQ coins that may be granted to the person who was k-th to pass the bioidentification in the Humaniq app (the user number k). **The objective number 1** tells that the function $E(k)$ should be decreasing one. We chose the simplest decreasing function — the linear one:

$$E(k) = E_{\max} - \frac{E_{\max} - E_{\min}}{k_{\max}} \cdot k$$

Thus, at $k = 0$ $E(k) = E_{\max}$, and at $k = k_{\max}$ the correspondence $E(k) = E_{\min}$ holds. We chose $E_{\max}$ equal to 860, and $E_{\min}$ equal to 140. Finally for

[2] We think that it is fair to issue coins stepwise depending on the everyday involvement of a user. We wish to avoid the mistake of some altcoins, which made their rewards one-time payments and which suffered from users not having incentives to use the platform on a regular basis.

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the maximum possible amount for the k-th video registrant

$$E(k) = \text{round}\left(860 - \frac{720}{k_{\max}} \cdot k\right) \tag{4.1}$$

Let us draw a graph showing the controlled supply of coins:

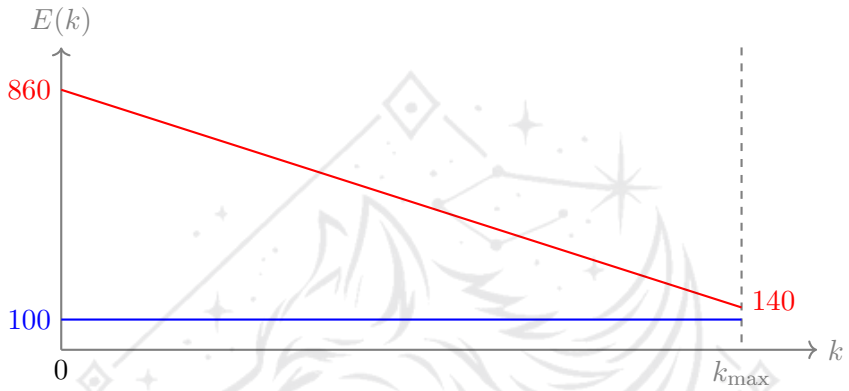


Figure 3: *The distribution of Humaniq coins. Red line represents the maximum possible amount of coins a user can be granted with respect to the scoring function. Blue line represents the number of coins that the user is granted if his or her only action is passing bio-identification.*

Denote the total amount of coins sold via Pre-ICO + ICO by V_{ico}. According to **the objective number 2**, only $4V_{\text{ico}}$ coins will be earned by users of the Humaniq app. Thus, the maximum possible amount of Humaniq coins is limited by $5V_{\text{ico}}$.

The objective number 4 states that the total average number of coins that a user can mint in-app must be close to 500, thus giving

$$500 \approx \sum_{k=1}^{k_{\max}} \frac{E(k)}{k_{\max}} = \frac{1}{k_{\max}} \sum_{k=1}^{k_{\max}} E(k) = \frac{1}{k_{\max}} \cdot (4V_{\text{ico}}),$$

$$k_{\max} = \text{round}\left(\frac{V_{\text{ico}}}{125}\right) \tag{4.2}$$

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immediately follows. This provides the restriction upon the total amount of people who can mint the tokens in-app.[3] We use the conventional rounding function to guarantee that $k_{\max}$ is integer.

The scoring function mentioned in **objective number 5** describes how people can earn their $E(k)$ coins in the Humaniq app. It is structured as follows:

(denoting the HMQ/USD exchange rate by r, so that $15r$ becomes the Humaniq equivalent of \$15)

- mobile app installation — $\min(\text{round}(0.01 \cdot c_1 \cdot E(k)); 15r)$ HMQ
- receiving first coins from a friend — $\min(\text{round}(0.04 \cdot c_2 \cdot E(k)); 15r)$ HMQ (one-time payment)
- passing the bio-identification — $\min(\text{round}(0.15 \cdot c_3 \cdot E(k)); 15r)$ HMQ (one-time payment)
- a referred friend passed bio-identification[4] — $\min(\text{round}(0.1 \cdot c_4 \cdot E(k)); 15r)$ HMQ (for every 5 first friends invited)
- execution of a transaction within first month after installation — $\min(\text{round}(0.05 \cdot c_5 \cdot E(k)); 15r)$ HMQ (one-time payment)
- execution of a transaction within second month after installation — $\min(\text{round}(0.1 \cdot c_6 \cdot E(k)); 15r)$ HMQ (one-time payment)
- execution of a transaction within the third month — $\min(\text{round}(0.15 \cdot c_7 \cdot E(k)); 15r)$ HMQ (one-time payment)
- additional earning opportunities are provided by local and global start-ups and senior companies.

For moments when exchange rate HMQ/USD diminishes, the emission can be delayed. The exchange rate is treated diminished, if

$$\text{current rate} < \text{average rate for the last week.}$$

[3] The Pre-ICO has passed, and some conclusions may be already done. Exactly 31824818 HMQ tokens were generated; thus, even before the start of the ICO, the inequality $V_{\text{ico}} > 31 \cdot 10^6$ holds, and, due to (4.2), $k_{\max} > 248000$.

[4] Humaniq balances cannot be fractional. You are invited to guess why, and then check your guess in the subsection 9.8.

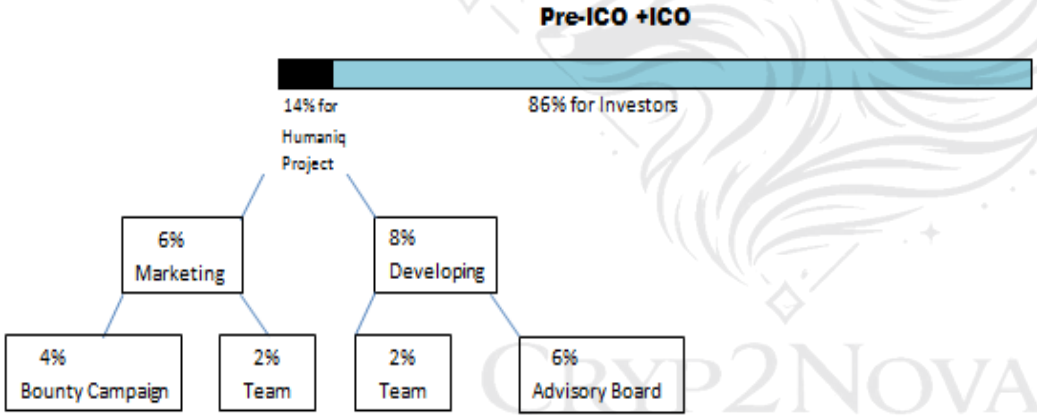
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By the start, every coefficient in the tuple $(c_1, c_2, c_3, c_4, c_5, c_6, c_7)$ is set to 1, but after some time these coefficients are going to become mutable. For the first period of their mutability, the control over these coefficients will be community-driven, but eventually this control will be forwarded to a neural network, whose goal will be to maximize several reasonable metrics (the installations' rate of growth, transactions' number rate of growth).

Thus, the amount of HMQ that can be granted to a user is $E(k)$, where k is the number of users who passed the identification before him or her. The formula (4.1) can be used to calculate the potential benefit.

The earning opportunities aren't limited by this. *Start-ups and senior companies pay additional amounts of HMQ* to people executing their tasks. The list of tasks available at you region can be found in the tab «Offers». Our ultimate dream is that *everyone could purchase the smartphone, install the Humaniq app and then cover his or her expenses on the same day, executing simple actions.*[5] That is why we tether our emission to the Humaniq equivalent of $15.

5 The ICO



"Just as treasures are uncovered from the earth, so virtue appears from good deeds, and wisdom appears from a pure and peaceful mind. To walk safely through the maze of human life, one needs the light of wisdom and the guidance of virtue."

Buddha

Despite we have enough money to develop the project on our own, we think it is fair to allow *everyone* to invest in the project. To make the procedure egalitarian, we have chosen to utilise cryptofinancing via an initial coin offering (ICO) rather than take on venture capital. Moreover, a crowdsale is a brilliant way to attract media attention.

Our crowdsale has two stages — the Pre-ICO and the ICO. The Pre-ICO took place since 15 Dec 2016 till 28 Dec 2016.

The ICO starts by 6 Apr 2017, CET 00:00 and ends by 26 Apr 2017, CET 23:59.

[5] The price of cheapest smartphone able to perform mobile wallet functions and fitted with front-facing camera falls down every year and is now about $10-20.

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To buy Humaniq, the only payment options during the ICO are Bitcoin (BTC) and Ethereum (ETH). During the ICO, the rates are as follows:

1 ETH buys 1000 HMQ (+ bonuses)
for BTC-buyers: your BTC counts as the equivalent amount of ETH[6]

We also offer the following bonuses for those who invest earlier:

6-7th of Apr	+ 49.9%
8-14th of Apr	+ 25%
15-21th of Apr	+ 12.5%
22-26th of Apr	+ 0%

Since all Humaniq balances are whole numbers (integers) and fractional amounts of coins are not possible (see subsection «Coins are integer» for the reasoning), we had to come with the solution for the arising subtlety. We chose different ways to handle the problem of fractional HMQ for Bitcoin-using and Ethereum-using participants.

For Bitcoin participants, if the amount of HMQ to be bought is less than 112358 HMQ, rounding down is performed; otherwise, if a buyer wishes to buy more than 112358 HMQ, the amount of HMQ to be bought is rounded up.

For Ethereum participants, we decided to conduct bounce-back transactions (and hardcode them in the smart contract). E.g. if you transfer 3.1415926 ETH and no bonuses are applied, you are about to receive 3141.5926 HMQ, but since HMQ balances are integer, the amount of ether equal to 0.5926 HMQ is sent back to you.

Participating in the ICO doesn't require passing bio-identification.

5.1 The key holders

Our fundkeepers are:

Alex Fork
George Basiladze
Bitcointalk user btcsec

[6] with respect to the BTC/ETH exchange rate at the moment of purchase

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6 The Pre-ICO (survey)

The purpose of the Pre-ICO was to create a discussion on issues raised by the project, to attract the attention of leading experts in the industry, and to raise funds to prepare the promotion and public relations of the project, as well as prepare a quality ICO.

We chose the following rates for the Pre-ICO stage:

1 ETH buys 1500 HMQ (+ bonuses)
for BTC-buyers: for the whole Pre-ICO campaign, we treated every your bitcoin as 93.5 ETH

We announced that if the amount collected is less than 10000 ETH, all funds will be returned. Fortunately, we collected[7] 99.002855 BTC and 3122.362977 ETH, which amounted to more than the announced threshold.

The following bonuses were available during the Pre-ICO stage:

First 12 hours	+ 70%
16th of Dec	+ 50%
17-19th of Dec	+ 33%
20-22nd of Dec	+ 20%
23-25th of Dec	+ 7%
26-28th of Dec	+ 0%

We are delighted to inform you that 31824818 HMQ tokens have already been distributed during the Pre-ICO (in complete accordance with these bonuses), and we look forward to our upcoming ICO, which will provide the answer on the final quantity of tokens that can ever be generated V_{ico} and thus determine the constant $k_{\max}$ from (4.2).

All rewards and bounties were distributed within one week after the end of Pre-ICO, just as it was claimed.

7 Our development process

"Success or failure of a team is determined by how its members communicate and interact."
Ichak Adizes

[7] To stress his personal responsibility for the pre-ICO, our founder Alex Fork decided to use the bitcoin wallet he uses since 2013. To make accounting easier, right before the start all the bitcoins were drained away from there, making the balance zero.

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Future Fintech keeps in contact with more than 200 fintech start-ups. One of the challenges of most projects is access to the customer base. This is why the implementation of our solution will help young projects (P2P lending, insurance, mobile wallets, scoring, freelance, etc.) offer their ideas to people who have no experience in the financial sector. Therefore, the project will be developed as follows.

The main development team develops the core. Others join later and develop their start-ups or solutions on a ready-made platform. We use Github to bring the core team and third parties together.

We are open to get suggestions and ideas from ordinary users — from the Community. We always keep in touch with them via the Humaniq app, as well as on Bitcointalk and on our brand blog on Medium. Users also join us via our Slack channel, read the latest news on Facebook and Twitter, and participate in discussions on our subreddit.

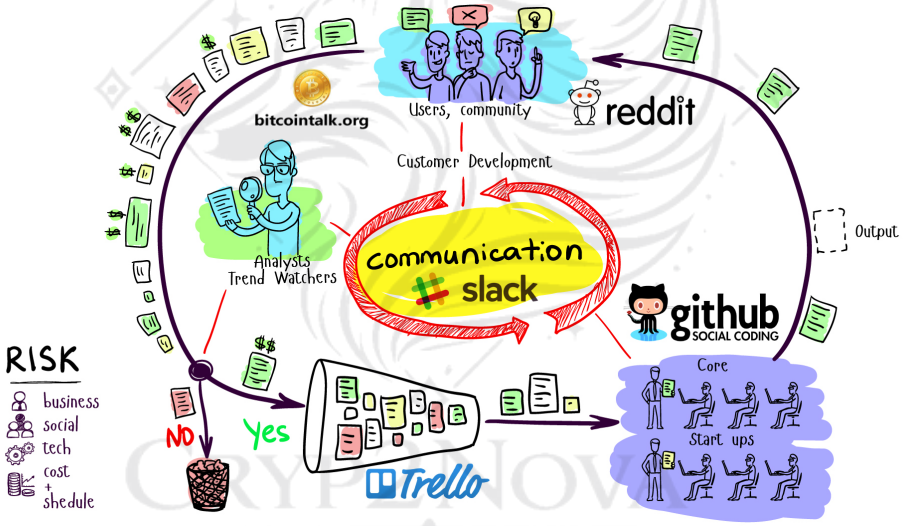


Figure 4: join us to see how we work

Close interaction with users and testing an idea or a prototype on potential consumers allows us to make the right decisions and save resources. This is why customer development greatly reduces the investor risk. After all, theory often differs from practice, and developers' opinions on ergonomics and ease of use may differ from the perceptions of the product's end users. Users often have their own understanding of a set of *must have* functions, and ignorance of their real needs can lead to the failure of the entire start-up.

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As such, our analysts and trend watchers, together with the developers, will consider every feature request communicated by users in the community. Some ideas greatly improve the product; but, at the same time, the development of one option can take an hour or two, while the implementation of another can take a few days.

Analysts and trend watchers will also evaluate the feasibility of each request and explore it within the context of market trends. The developers, in their turn, will integrate them properly if new ideas are given thumbs up.

At the same time, budget and deadlines must be met. Therefore, some ideas are rejected for one reason or another, while others form the list of tasks for the team of developers.

Thanks to this, analysts, trend watchers, investors, users, project managers and programmers themselves are always aware of the current development stage of a project. Any interested user and even a developer can connect to it from various sides and get a respective reward:

- participate in beta testing;
- voice their ideas for improving the product in the Community;
- develop their start-up;
- become an analyst or a trend watcher.

As you can see, our project development scheme allows and supports the active participation of users. Customer development allows us to create a product that meets their needs and wishes, which eventually ensures its success.

8 The timeline of Humaniq

"The best way to predict the future is to create it."

Peter Drucker

The milestones on this road are:

- *2016, October-November* — Humaniq Whitebook is written
- *2016, December* — Launch of Humaniq.co website.

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- *2016, December* — the pre-ICO.
- *2017, January-February* — smart contract development, due diligence, marketing campaign
- *2017, February* — a meeting with Humaniq project partners in India.
- *2017, February* — announcing Humaniq online-hackathon in partnership with (yet undisclosed) well-known blockchain media
- *2017, February* — the start of the ICO (crowdsale).
- *2017, April* — headlining the BlockShow Europe 2017, giving talks on panel discussions, concluding results of the hackathon and giving awards to winners
- *2017, April* — crowdsale concludes.
- *2017, May* — prototype of Android mobile app.
- *2017, July* — **Product launch**: the mobile app (wallet with bioID) + exchange app.
- *2017, September* — global expansion in two directions: to underdeveloped regions (expansion of the network of users in Africa, Asia, South America) and to the cities that are crucial to modern business (London, Singapore, Hong Kong and San Francisco).
- *2018* — integration of virtual cards, of fintech start-ups, and further decentralization of Humaniq architecture.

9 Technical

"Architecture is inhabited sculpture."
Constantin Brancusi

From the technical point of view, to implement the idea, the following ingredients are required:

1) mobile app, which is what users see. We're talking about Android app, since in underdeveloped regions market share of Android OS is close to 95%. Making an iOS App is less important in our case, but for the sake of perfection we actively develop it.

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2) appropriate bio-identification/authentication software

3) such software essentially produces a «chunk» of every person's identity; these chunks are used for identification/authentication and must be stored somewhere in decentralized manner

4) these chunks must be encrypted

5) identification procedure must cost zero for end users (at least for the first time)

6) authentication procedure must cost zero for end users (at least for the first time)

7) secure consensus algorithm (e.g. robust blockchain)

8) transactions should cost zero for senders if possible.

To satisfy the first and second conditions, it is enough to build the apps, and to buy licensing rights for the best available bioID solution. Chapter 9.2 is devoted entirely to how we made our choice of the solution.

To satisfy the third condition, we should allow every PC to become a Humaniq node. On encryption (fourth condition), our approach is similar to Storj and (announced by Ethereum) Swarm's one.

To meet the fifth condition, it is enough to specify in the protocol that nodes have to add «chunks» of a new person to their database, keep their databases synchronized, and are not paid for that. It's exactly like in Bitcoin: full nodes kept on their hard drives containing the ledger of all transactions that have ever happened without any financial incentive.

The sixth condition resolves like the previous one: people verify and broadcast identities of authenticating users for free. Again, exactly like in Bitcoin: peers verify and broadcast new blocks and transactions, and nobody gets paid for that.

Speaking on condition eight, for the first few months of the network's existence transaction fees will be zero for end users. However, this is to be changed in future, since the founders cannot pay Ethereum fees forever. We are about to decentralize the project architecture and to make it non-dependent on founders, giving everyone the possibility to run a Humaniq node.

We are using Ethereum for the project and the ICO campaign because this platform allows us to create a secure solution quickly, with few resources, and without loss of quality thanks to:



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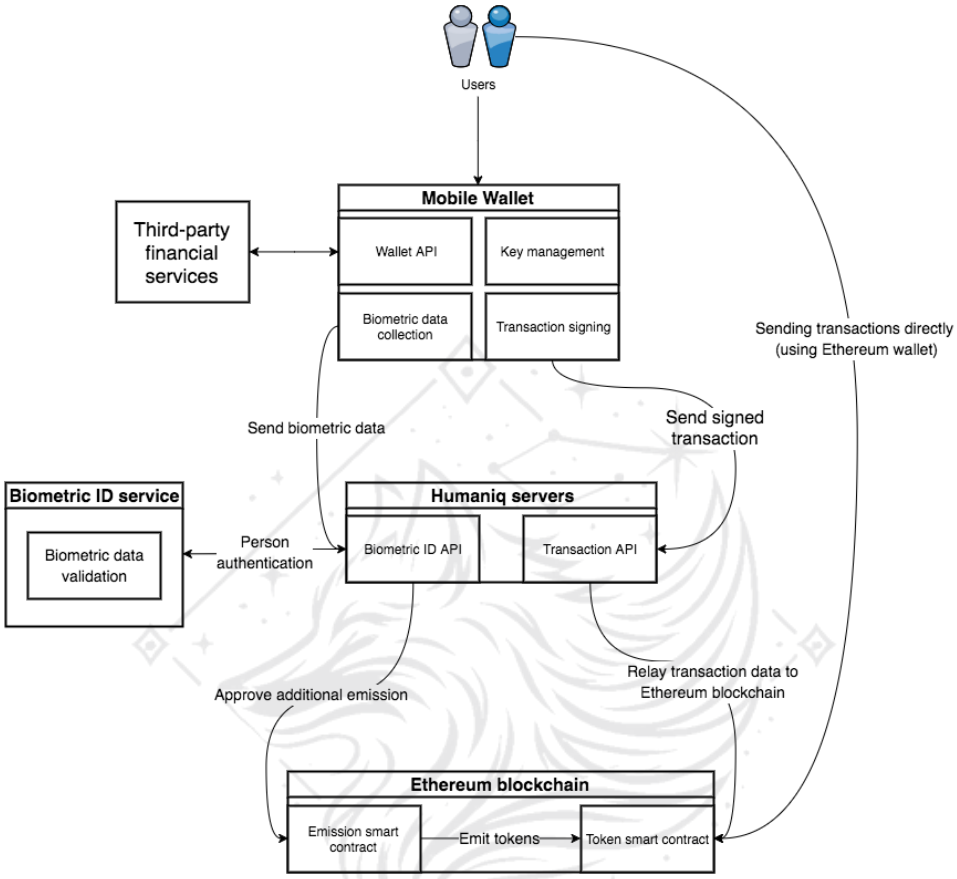


Figure 5: The inner structure of the Humaniq platform

- smart contracts (we plan to conduct the audit of our smart contracts);
- reliability of a ready and operating blockchain, in contrast to the risks associated with deploying own blockchain;
- future development of the Ethereum project and stated opportunities.

The only tough issue is the centralization. Humaniq has several components: software part, neural network and database. In the future, all these components are to be decentralized.

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9.1 Issues and responses to them

Humaniq is based on blockchain technology. Major component — transaction settlement will be done on Ethereum blockchain using Standard Token (ERC20) contract. New tokens are emitted for every authenticated user and the rules of emission are controlled by «Emission smart contract». Humaniq servers are responsible for authorization of users on the blockchain via Biometric ID services as well as approving additional token emission. Users will only interact with Mobile Wallet for their smartphones.

Scrupulous readers may say that this system has a number of centralized places carrying risks. But there are answers to this:

1. Each user can use the Ethereum client wallet without using additional services.

2. It should be admitted that Bitcoin protocol add-on services are used by an overwhelming majority of Bitcoin users; and this is the normal operation of a payment system, and our operation will be based on the same principles. And since security issues are undertaken by Ethereum, this allows us to focus on the client-oriented decentralized business model.

3. With reference to bio-identification and mobile wallet, we will move towards open source and hereafter decentralization.

4. Besides the above-mentioned, the service development strategy is a decentralized business model, i.e. stimulating creation of several mobile wallets by third-party teams, chatbots, exchange services, service rendering.

5. Today there is no technological opportunity to put bio-identification into blockchain, however if there is a possibility to help people now, and to develop ecosystem of cryptoeconomics — it should be done.

There are three key components of Humaniq:

- the app (which is essentially also the mobile wallet)
- Humaniq servers
- contracts on Ethereum blockchain.



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9.2 BioID: technology

We understand that biometry is not finance, and we're not specialists in this technology. As a consequence, we're actively working with various well-established companies, who specialize in computer vision and/or image recognition.

Hence, to execute bio-identification, we are going to invite a solution provider when we are ready to make the choice. We have not yet signed any formal agreements, and, due to the high responsibility of this step, we are not rushing. We plan to announce which service provider we have chosen and to provide corresponding formal agreements during the crowdsale.

9.3 BioID: user experience

During the first launch of the Humaniq app, one must pass through the bio-identification procedure[8]. Otherwise, the Humaniq interface just won't show up.

This bio-identification is arranged as follows. A registrant is required to make a photo of themselves with the smartphone, to record a video of smiling and grinning, and to pronounce the text shown on the screen. To avoid counterfeits, the device ID is added and the text is chosen at random out of very large pool; it eliminates the ability to use pre-prepared audio tracks. All the instructions are shown on the mobile phone screen, so of course no prerequisite knowledge is needed to use the app; you don't need to know anything about the app in advance. You may download the app from Google Play and try it yourself.

This authentication method takes less than five seconds and requires no e-mail, SMS, passport, and you don't have to worry about losing or forgetting your password. This is the real *proof of identity*.

9.4 Mobile Wallet

The Mobile Wallet is an interface for mobile (iOS, Android) users that provides them with quick access to their balances and lets them transact with other users/merchants.

The Mobile Wallet manages private and public keys for the user, which are used to sign transactions locally.

[8] Fortunately, a frontal camera and a microphone are now built in all devices.



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It also has a built-in module for collecting biometric user data, such as voice and video, which can be used to bind a user with their identity and provide them with additional features of the platform, such as action-based emission.

The Mobile Wallet also includes an API for third-party developers so they can interact with the Wallet: access balances, send transactions.

9.5 Contracts on Ethereum blockchain

There are two contracts that are already deployed on the blockchain. First one is Standard Token Contract (ERC20) that keeps track of user balances and allows them to transfer tokens between each other. Second one is responsible for token emission. However, we understand that with the decentralization proceedings we will be involved in the development of an ample web of contracts; follow our Github to stay keen on updates.

9.6 Sending a transaction with Mobile Wallet

1. Transaction is generated on the smartphone and then signed using local private key.
2. Signed transaction data is submitted to Humaniq servers.
3. Transaction is relayed to the Ethereum blockchain to the Humaniq Token Smart Contract.

9.7 Sending transactions without Mobile Wallet

1. If the user already has Humaniq tokens they might transact directly using Token smart contract bypassing Humaniq servers.
2. After signing the transaction user might send it directly to Ethereum blockchain.
3. This brings an advantage of control over the transaction publication and propagation (because there might be a delay due to a high load on the Humaniq servers).

9.8 Coins are integer

Any Humaniq balance cannot be fractional. It can only be integer. We're targeted at providing undereducated people with modern finance, and we

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don't expect all of our users to be great at fraction calculus. The integer amount of coins makes it easier for undereducated people to count their money.

10 Conclusions

The Humaniq project was launched to create a financial infrastructure for people who were previously isolated from it. We are using the most advanced and mass technologies: the blockchain with the possibility to connect third-party projects, a mobile application, along with bio-identification. Humaniq will also add to the science of cryptoeconomics, the well-being of developing countries, and can even benefit the European economy.

For cryptoeconomy:

- expanding the amount of cryptoeconomy users will result in a positive development in this industry
- original inherently friendly and open source architecture of Banking 4.0 will help start-ups to get instant access to customers around the world and obtain financial support from the Humaniq project
- bio-identification will allow testing reputation systems and personalized interaction programs, introducing this realm to charitable organisations, NGOs and United Nation services.

For developing countries:

- poverty level reduction
- remote work and economic growth: greater opportunities for savings will increase the lending capacity of the population; collection of customer financial data will reduce lending risks
- innovation and infrastructure: electronic finances will allow the creation of new business models and products
- reduction in class inequality: financial services can provide new opportunities for billions people living on less than $2.50 a day and bring them to the middle class, greatly improving their lives

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- establishing gender equality: engaging the female population in the electronic finance system will raise incomes of health care and education systems; a barrier for women in financial account registration will dissolve, and women will have more control over their funds and business
- improving the quality of education through remote access and payment capabilities.

For the EU:

- improving the economic situation in third world countries will reduce the current immigration challenges faced by advanced economies, particularly in the European Union where the influx is creating huge strains on the social welfare systems and high costs associated with the problem.

Humaniq is not welfare or charity, we are more about empowering people to change their lives and pull themselves out of economic disparity by participating in a new digital economy that they can help build.

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