

Nodio White Paper

v. 1.0

<https://nodio.net>

September 01, 2016

Motivation

Since the beginning of times, humans allied in groups to progress faster and get better protection. Soon they discovered that centralization was an optimum model of governance for those groups. It helped them to develop more rapidly, become bigger and stronger. But as time passed, adverse aspects of centralization started to rise - corruption, inequality and abuse of authority were only a tip of the iceberg.

With the invention of Internet, humans received a new chance to get their freedom of speech and the right to privacy. But the technology always moves forward, and it didn't take long before the World Wide Web became infected too. Multibillion-dollar companies seized control over users by creating "free" online mass market products. Free email accounts, free search engine results, free social media accounts have one mission in common: gathering and "selling" to advertisers the most valuable product on Earth - information. Governments of many countries also understood the significance of this product and passed complicated laws to be able to reach it.

The new hope is blockchain technology, but it has already drawn the attention of politicians, for example, multiple attempts to deanonymize Bitcoin have taken place. That's when we decided to take

action and create a simple yet effective product for every user. During the research and development, we discovered for ourselves tons of possibilities blockchains are capable of. Soon, Nodio became not just a safe router, but a platform for endless solutions which cover multiple industries.

We believe that blockchain technology together with decentralized applications can ensure privacy and restore our basic online freedoms. The goal of Nodio is to bring those changes in the most simple for a user way - through the endless possibilities of our device. We perceive a dream of a safe future and can't wait to fulfill it.

Nodio

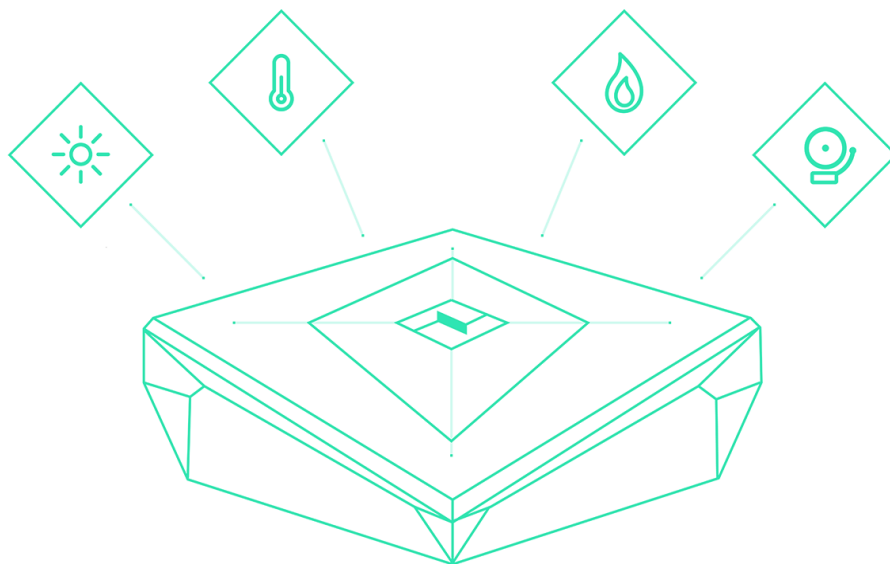
Nodio is a hardware blockchain-based complex with guaranteed privacy. Nodio performs a significant number of functions, starting from providing an Internet connection and finishing with the ability to fully manage the whole smart home. It is a comfortable and intuitive solution which solves multiple problems people face on daily basis. Nodio substitutes a router by delivering a top-speed connection to your devices. It also works as a personal micro server - stores decentralized applications and their data while protecting them by using a high-level security combined with blockchain resources.

Nodio interacts with your devices through a personal VPN network (or VPN over TOR Network). It guarantees the highest level of secure connection. Your devices act solely as an interface for Nodio because it is impossible to implement full encryption locally or store a blockchain due to the technical limitations.

Autonomy

Nodio is designed to keep working nonstop even in emergency situations. It is equipped with a powerful 4000 mAh battery in case the electricity shuts down. That, together with an LTE ensures a 24/7 Internet connection and a 99% uptime for a microserver to run the dapps. The LTE module will keep Nodio going if there should be any troubles with the primary source of the Internet. In the worst case scenario when the mobile network is absent, the mesh networks can still transport data.

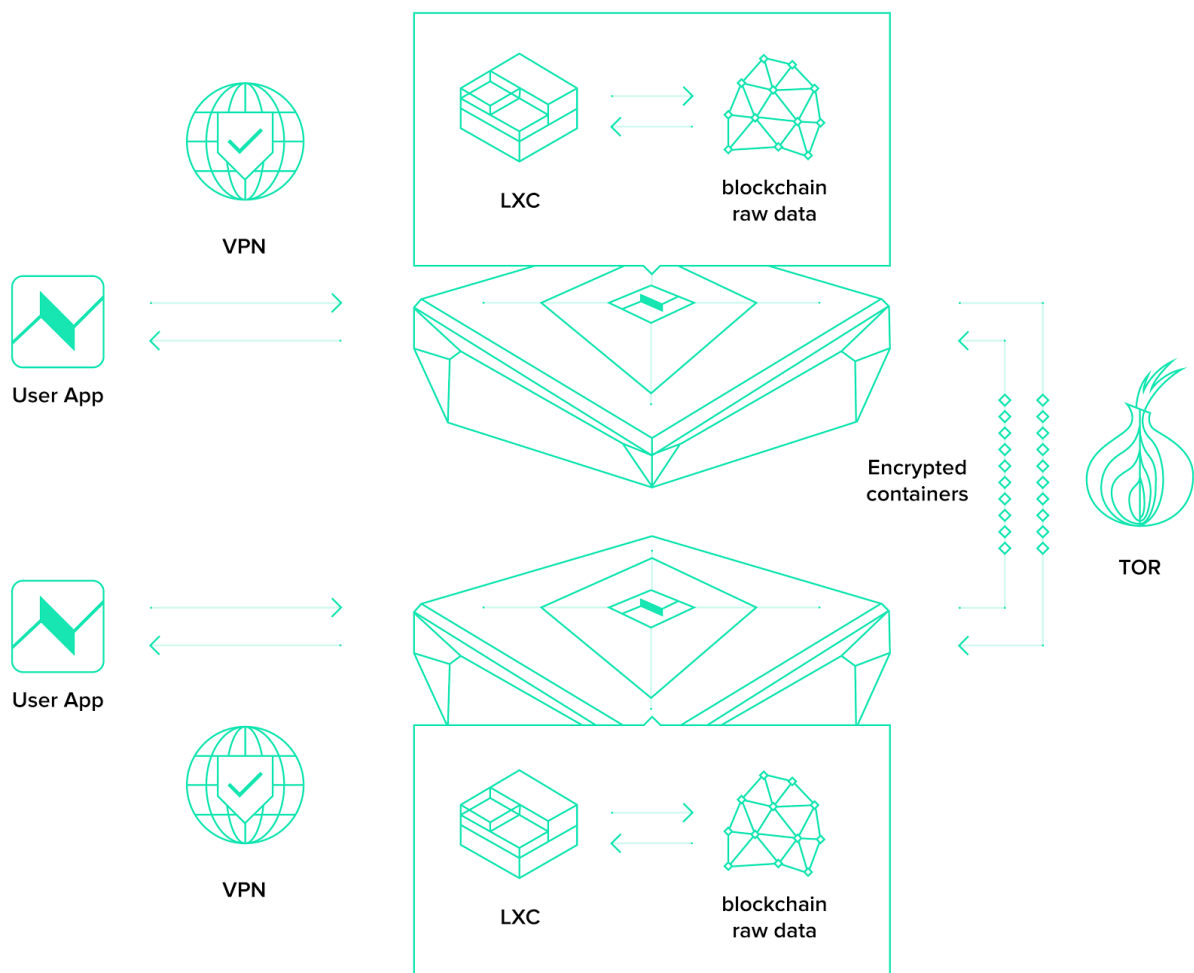
Extensibility



Keeping in mind that different users have different needs, we designed Nodio as the center for connecting with various modules. A zigbee, BLE or mesh protocol will expand the capabilities of the device in the future. Every user will be able to customize the device with additional storage, a higher capacity battery, alternative means of communication, etc. A universal bus for connecting additional solutions will allow expanding the opportunities of a personal security center in just a few minutes. Presently we are developing modules that will increase the Internet

coverage area at your house. They can serve as a platform for gas, light and temperature indicators which will become a part of simple and affordable smart home solutions.

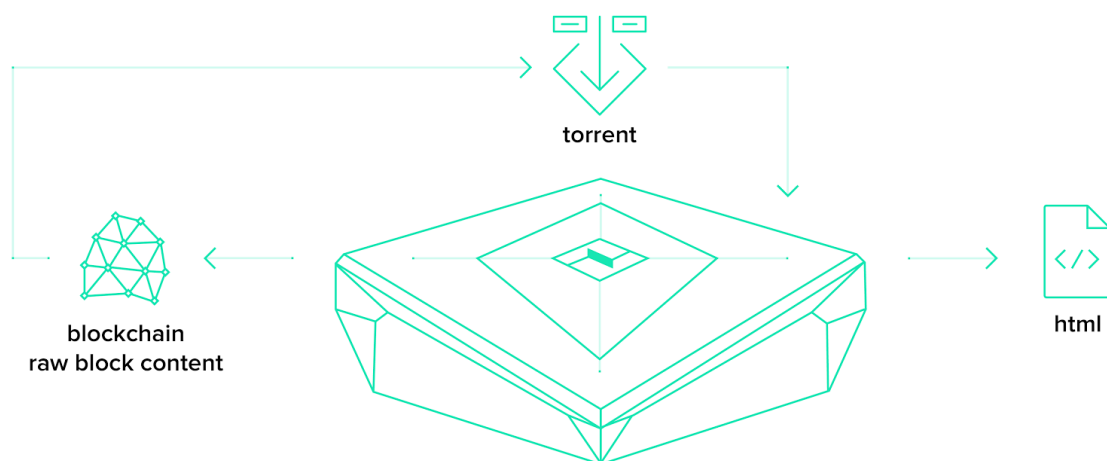
Xana



Nodio works with decentralized applications built on Xana platform. All dapps developed on Xana and ran on Nodio have an open source, so you could see for yourself that they are totally transparent and have no pitfalls. Nodio enables creating a working connection scheme with no central unit (which, in most cases, gets easily hacked). The main goal of this device is to become a tool for the developers to build end-to-end decentralized applications with a zero-knowledge proof.

Xana's decentralized application are based on blockchain networks. The core principle of the platform is to sustain the highest security requirements. That is why each app is created and ran in a separate LXC container with limited access to the other containers of the same network. We have simplified the process of building the applications by allowing developers to write them in any programming language of their choice. The interaction between user's dapps is carried out using 2048 bits encryption key or higher. The entire traffic runs through TOR networks to avoid possible disclosure of IP addresses. Traffic is transmitted between nodes in closed containers and is isolated from the relay holders and the interception of packets on the provider level.

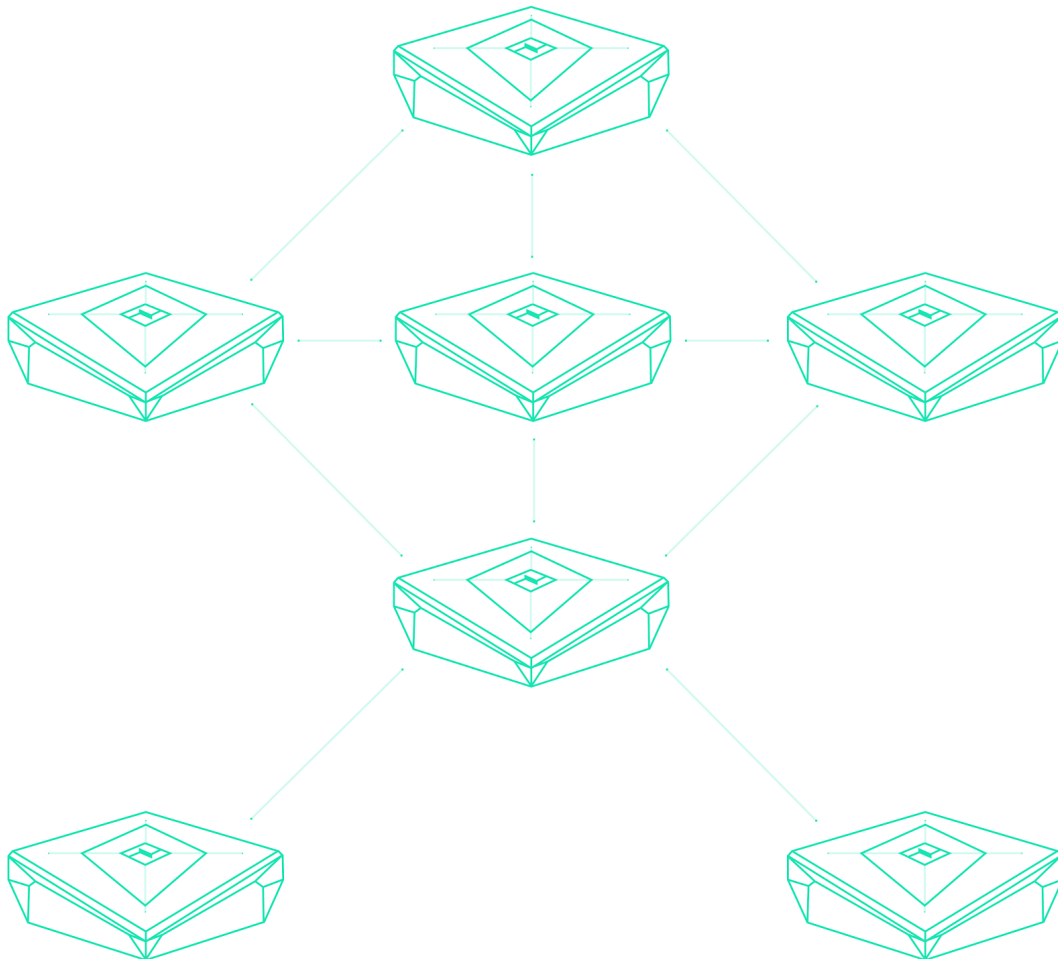
Private Internet



We see Nodio as a tool that someday will assist in creating the P2P Internet by being a connecting link between blockchain and Torrent. This new type of World Wide Web will have no place for privacy threats, data leaks, censorship or surveillance. It will be safe and free, just the way it was originally designed to be. Right now Nodio can be used for developing a blockchain-powered advertisement blocking database. A database like that will protect against malvertising, phishing, and other Internet scams. Users will access

only the content they choose to. Moreover, the solution will protect not just a single device, but its whole decentralized network.

Mesh Networks



To ensure the freedom of connection at all times we added an option to create the mesh networks. It's a type of the network with a typology built on a principle of cells, which are connected between themselves and can take over the role of a switchboard for other participants when every node is connected to each other. A large number of links provides a broad range for picking a route to follow traffic within the network, so the breakage of one compound does not disrupt the functioning of the entire mesh network. The biggest

benefit of mesh networks is the ability to transport the Internet to the places where it has no coverage and to build private networks.

Private networks are P2P and securely connect users between themselves with no external servers. Mesh networks allow users to access Internet network even in places with no coverage or during natural disasters. It can even serve as a guaranteed communication system for emergency notifications.

The branched relays mode

Branched networks are close to proxies but without the knowledge of a particular node. In fact, they allow changing the internet segment using any of the available open relays.

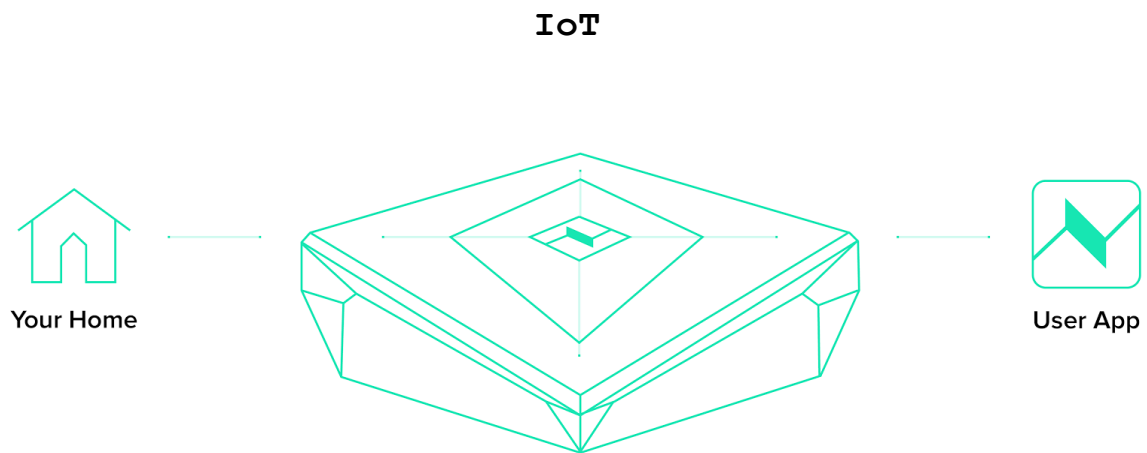
For the end-users, it gives an opportunity to access a certain resource as the residents of another country without spending efforts on long-term proxy settings.

For owners of the relay - a rapid relay setting and a bind to a segment (country), an easy setting of limits (speed, traffic, etc.).

For software companies - a simple test for the software and CDN resources from different segments of the Internet.

The possibilities of Nodio

Due to the use of blockchain networks and the specific features of our platform, Nodio opens endless possibilities for creating and using solutions for a vast variety of spheres in everyday life, ranging from the organization of distributed storage to management of a smart home.

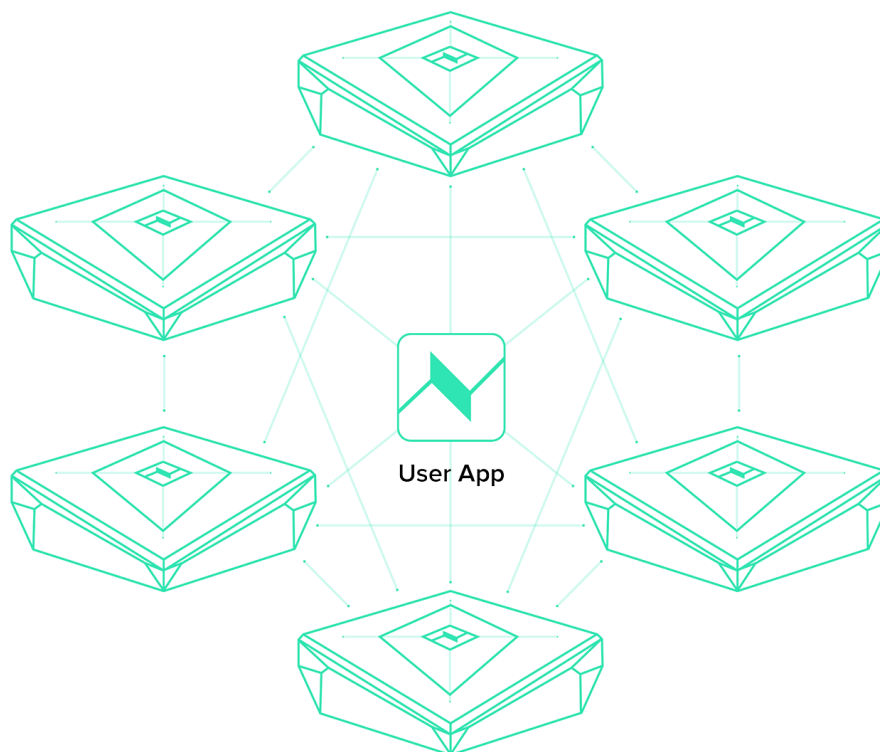


The management of the Internet of Things should be easy that's why we created Nodio as a single unit for the management of IoT. We focused on the fact that every device shouldn't be entirely open to the whole Internet world. All IoT devices connect to Nodio, and user controls them from the control panel. It is much easier to protect a single point connected to the web than multiple.

Nodio has enough computing power to operate the algorithms of a small street, not to mention ordinary apartment or a townhouse. Besides that, by implementing basic communication protocols of smart components (the hardware components are already present) into the Nodio's core, and providing an open API for writing your software, a boxed version for customization of smart homes can be offered.

Also, thanks to the possibilities of blockchain it's plausible to assign each device with an identifier to mark a beginning date of the warranty service of the product. Thereby ease and speed up the interaction between devices and the manufacturer (service center).

Distributed storage



Part of Nodio's disk space can be allocated to a distributed storage. It allows storing data on multiple devices, providing additional security (privacy).

Off-chain nodes can construct a distributed database. Each node has an encrypted data and a distinct view of shares, that is why the computation process is 100% private and fault tolerant. It is also possible to store unencrypted public data and link it to the blockchain. The distributed storage bases on a modified DHT protocol. It has extra persistence and secure point-to-point channels, reproduced by a public-key encryption and a broadcast

channel. In addition to splitting data into blocks and keeping them on various devices, blocks are also duplicated, which solves the problem in case any of the devices should be damaged. Everyone who wants to use a distributed storage becomes the part of a network of distributed repositories. This function can save you in a case of a device loss, your Nodio's data can be restored using Blockchain ID.

Personal (Blockchain) ID

Nodio makes it easy to create a precise digital blockchain-based identification. To confirm the identity of a person a publication in any public source with a signed message can be used. Afterward, you can link their name and a social network account to a public key.

These possibilities create a variety of options for personal identification systems. One can develop a BankID with a digital signature from the bank.

On the other hand, to keep the anonymity user can use an "anonymous key", which is confirmed by the network. In this case, it is impossible to link it directly to the personal public key.

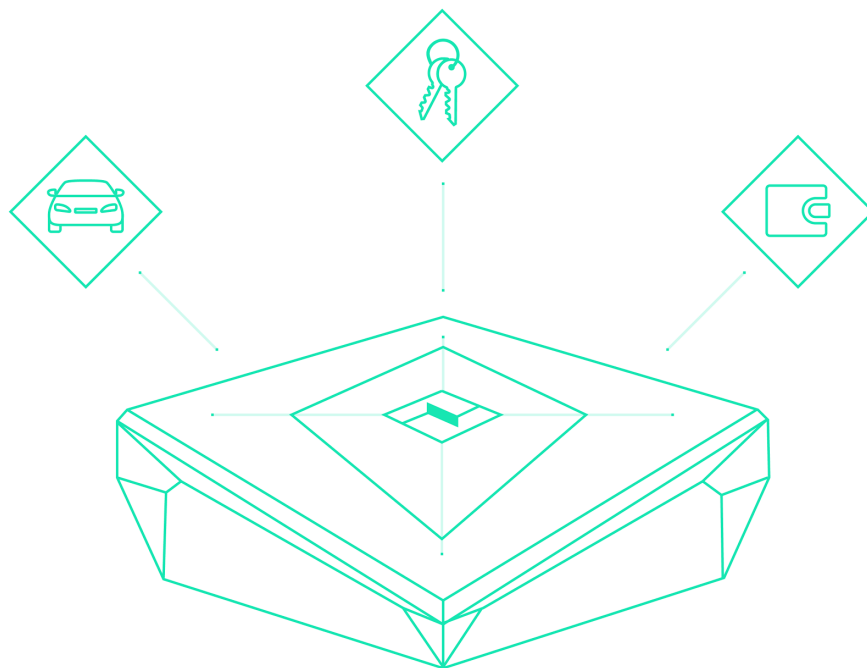
Finance

We see enormous possibilities for Nodio in a financial sector. A blockchain ID provides an opportunity to use P2P transactions available nowadays thanks to cryptocurrencies and perform lending or deposit operations without the fear of fraudulence. A digital ID and Smart Contracts will protect a person or an organization from scammers. Another great opportunity for this sector is the creation of services without the central node through which it will be possible to use cryptocurrencies such as Bitcoin or any other in the conventional retail sales points.

Communication between users

Data transmission, including voice, is one of the today's most fundamental issues, because data privacy begins with the personal correspondences, posting, file transferring, etc. Nodio can be easily implemented into digital social solutions and guarantee full privacy to a user. Time will come, when decentralized social solutions like instant messengers, social networks, and blogs will become an Internet standard instead of being a tool for people who have something to hide.

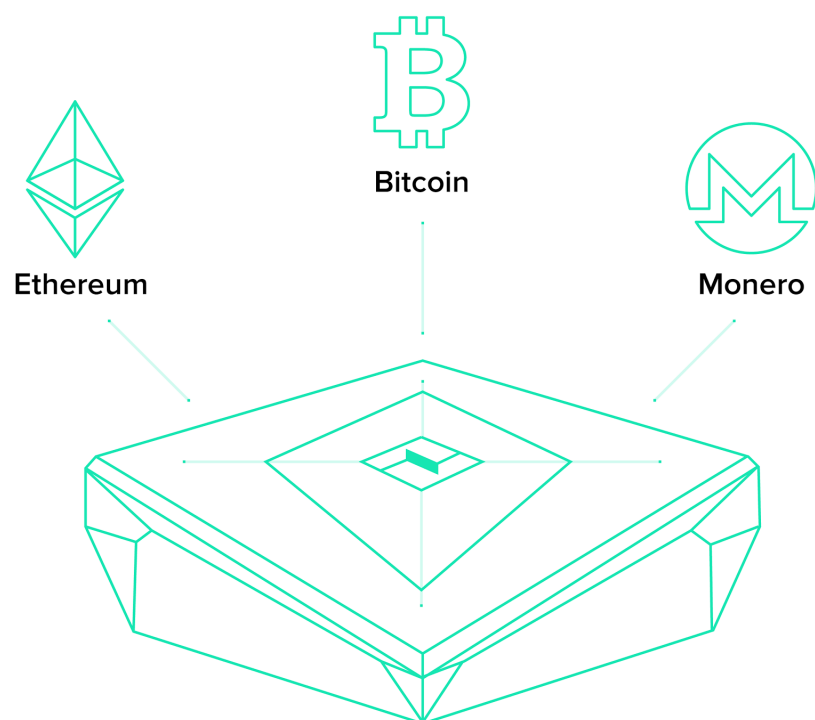
Sharing economy



Nodio has the potential to become an ultimate device for sharing economy. For hundreds of years, people were making deals with the help of a trusted third party (banks, realtors, notaries, etc.). The weird thing is that banks tend to get bankrupt, realtors often are overpriced, and the notaries corrupt. Nodio makes that "trusted" third party disappear by switching it to a reliable blockchain community. It will save you money, but most importantly - time. For

example, you want to rent a house or a car. Ethereum, Lisk, Waves, or similar blockchain can ensure a smart contract between two parties while Nodio allows them to follow it through without a personal presence. A lock of an object of rent connects to Nodio - now it can be rented remotely by providing a tenant with a digital key, which will be available after a successful payment using a smart contract.

Blockchain fusion



We don't see a reason to create another cryptocurrency and a new blockchain when there are already available a few popular networks that can satisfy the needs of new solutions based on their platforms. Nodio combines them together in a single solution and use strengths of each of them to perform the most suitable task. For instance, one can create a solution where two parties will conclude an agreement by combining an Ethereum smart contract, Bitcoin's blockchain ID for identification and complete it by paying anonymously through Dash, Monero, Zcash, etc.