ICEO

Blockchain 2023

Deep dive into blockchain trends for business and technology

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What's Inside this Guide?

The year 2022 was a bonanza for blockchain applications! This groundbreaking technology is no longer just for crypto-crazed enthusiasts, as it's gaining widespread recognition across a range of industries. With new ideas popping up every day, the potential for blockchain is truly limitless - and we're just getting started.

But what does the future hold? That's where this guide comes in. Our team of multidisciplinary experts at ICEO is constantly exploring the latest tech trends and innovative businesses, so you can stay ahead of the curve. We're here to help you harness the power of blockchain and unlock its full potential. So buckle up and join us on this exciting journey into the world of blockchain!

This e-book is divided in two sections:

Blockchain-based tech trends plus use cases

We'll kick off by showcasing the latest and greatest blockchain-based technology trends. From existing to emerging trends, we'll give you real-life examples and application scenarios to illustrate their potential.

- Soulbound Tokens
- Green crypto
- Regulated digital currency
- Find2earn
- Prepaid cards in crypto
- Multichain bridges

Branches facing the blockchain revolution plus use cases

In the second section we'll explore industries that blockchain may soon change beyond recognition. We'll highlight groundbreaking projects that have already implemented bold blockchain-based ideas.

- AI
- Smart Cities
- Fashion
- Sport
- Medicine
- Education
- Agriculture
- Supply chain
- Cybersecurity
- Real estate

About ICEO:

Who we are

We build tech companies in the Venture Building model. We transform good ideas into innovative startups that we efficiently launch and scale using our own assets, know-how and networks.

How we work

We set up companies
We are serial founders – we develop ideas for new startups and turn them into autonomous companies.

We scale efficiently
We have our own ecosystem of resources: proven processes and technologies, as well as expert teams and a vast network of relationships, which helps us enter the market and scale up efficiently.

We build future-ready companies
We are specialists in innovative tech companies. We're all about harnessing the power of blockchain, AI, ML, Big Data, and more. Our focus is on the next generation of the web: Web 3.0. At its core are concepts that are important to us, such as metaverse and decentralization in terms of financial transactions and control over one's own data. We build companies that reflect those values.

How we generate ideas for new businesses

Our projects are usually based on ideas generated internally. At ICEO we have special departments, VB and R&D, which analyse the market and look for inspirations for new solutions and businesses.
This guide is based on the results of our multidisciplinary teams' work. Continuous learning and exploring new insights are at the heart of what we do.

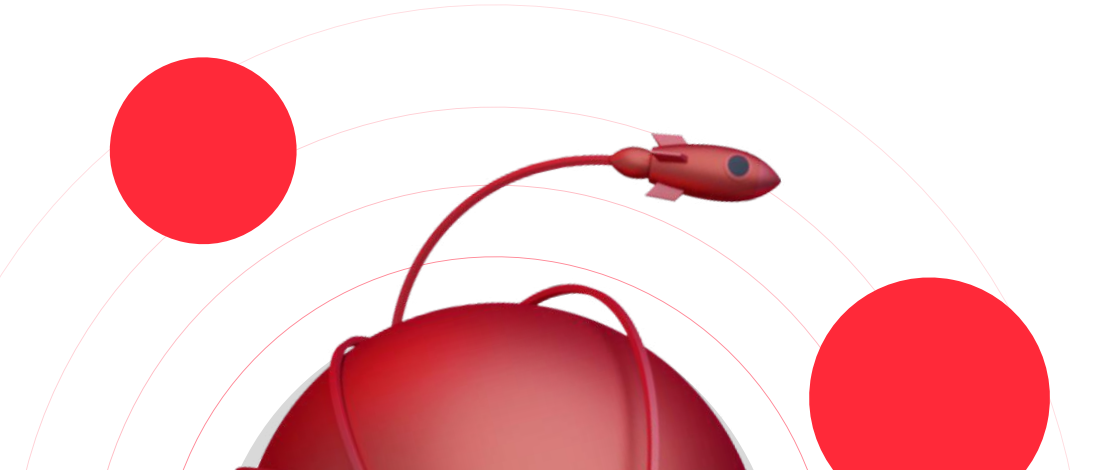
Section 1.

Blockchain-based tech trends
plus use cases

Blockchain has gained immense recognition in the last decade, thanks to Bitcoin. However, its capabilities go much further, and use cases are multiplying right before our eyes.

The features of blockchain technology, such as transparency, security and resistance to counterfeiting, contribute to its growing appreciation and position it as one of the most revolutionary technological tools of our century.

Read on to explore evolving blockchain-based technology trends, application scenarios and selected projects in which they are already employed.



01

Soulbound tokens: blockchain with soul

Why blockchain is the right technology for SBT

One of the key features of many blockchain platforms is that they provide some level of anonymity (or rather pseudonymity). Anyone can create an account on the blockchain and such an account is difficult to link to a user's identity in the real world. While this is good for anonymity and privacy, it creates problems in use cases where it is the identity verification that would actually be useful.

Why is it called Soulbound

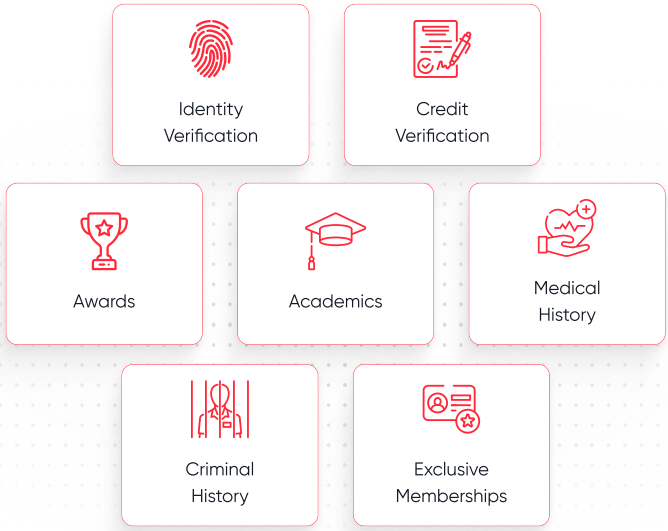
Unlike NFTs and cryptocurrencies, which can be traded on the open market and transferred from one wallet to another, Soulbound Tokens (SBT), are permanently tied to a wallet or account for its lifetime. Such wallets or accounts that hold Soulbound tokens are referred to as "Souls." These tokens cannot be sold, and ownership is granted on a basis other than price, which in the case of NFTs is usually the main determinant of affiliation. The idea is that SBTs will only be able to be revoked by the issuer of the token in question.

Soulbound tokens and security

In order to protect Soulbound tokens from the possibility of theft, Vitalik Buterin (creator of Ethereum and one of the proponents of the concept) has proposed a community-wide adoption of a "social recovery model." Through a "social recovery" mechanism, users can designate a group of individuals or institutions as "guardians" who have the ability to access and change the private keys to their soulbound token-assigned wallet if it is compromised.
You might have heard a lot about this concept before mid-2022, but a smooth implementation into practice remains to be seen. We will still have to wait for widespread application.

Examples of the use of soulbound tokens:

Safer lending	The ease of calculating public liabilities using SBT would enable open source lending markets. There would be new correlations between SBT and repayment risk, creating better lending algorithms that predict creditworthiness, thereby reducing the role of a centralized, opaque credit scoring infrastructure.
Stabilizing DAO	It will be possible to give ownership of governance tokens once and for good, preventing unequal distribution of power - the rich will not be able to buy voting rights from others, and thus will not be able to take full control of the DAO.
Assignment of medical records	SBT tokens would store all of our medical records, streamlining the processes needed for registration at medical institutions.
Assignment of identity documents	Attach identity documents to a given wallet, such as a birth certificate or ID card, making it easier to identify a person and ensure that we are dealing with a particular, real person.
Assigning access credentials	SBTs can replace passwords and similar user identity verification mechanisms, providing access to certain systems or resources.
Assigning scientific credentials	Soulbound tokens can encode certificates and academic credentials, such as diplomas, professional certificates or other similar documents. SBTs belonging to accrediting bodies (universities, training centers, etc.) can create a certificate that the owner of a particular Soul has obtained that certification.



Potential applications for Soulbound tokens. **Source: nftnow.com**

Selected projects using Soulbound tokens:

poap.xyz

POAP, or Proof of Attendance Protocol, are digital badges in the form of NFTs, awarded to app users after attending an event that collaborates with the POAP platform, as a way to confirm their attendance at partner events. Organizers can create their own event on the POAP platform to customize the projects and products they will offer to attendees. POAP is a platform that still uses NFT tokens at this point, but has great potential to become a platform that issues SBT tokens.

proofofhumanity.id

Proof of Humanity (PoH) - is a social identity verification system built on Ethereum. PoH combines trust networks, reverse Turing tests and dispute resolution to create a list of people resistant to Sybil-type attacks (i.e., those in which an attacker creates multiple fake accounts to achieve some effect). Currently, we create a profile on the platform, connecting our digital wallet and performing a series of steps to confirm our identity (currently still without token credentials). The mere approval by the platform assures our identity. However, the portal has a predisposition to become an issuer of Soulbound identity tokens.

trinsic.id
Trinsic offers digital wallets where we can save our data in card forms, such as certificates, important documents, credentials, etc. A platform with the potential to issue SBT tokens.

everym.com
Evernym was founded in 2013 to solve the digital identity crisis. Evernym created Hyperledger Indy and Sovrin Network, and the company is also a co-founder of the cheqd network and a major contributor to Hyperledger Aries and Ursa. In addition, Everyn created Verity, the world's leading verifiable credential platform, which has been tested for enterprise-class performance and already supports live deployments in finance, healthcare, travel, education and government.

02

Green cryptocurrencies

Why cryptocurrencies need to change

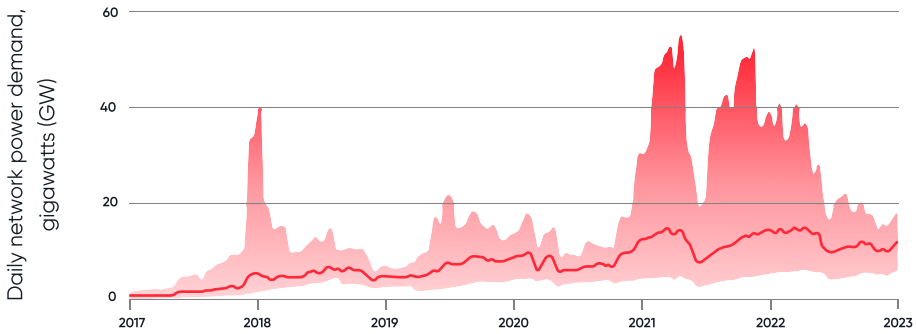
We will see attempts to replace fossil fuels as the primary form of energy, with a less damaging and renewable one - this is happening in other industries and will have to happen in this one too. Mining Bitcoin consumes huge amounts of power, which works against its reputation in the public eye. The growing awareness of cryptocurrencies' energy consumption and repression in various countries, such as China, will likely force the crypto industry to adapt.

How to create more sustainable cryptocurrencies

The most obvious solution is simply to change the consensus algorithm from Proof of Work to one that is more favourable to the environment, such as Proof of Stake. This algorithm needs much less computing power to create the next block.
If the PoW mechanism is left in place, projects will be forced to change the primary form of energy supplied to one that is environmentally favorable - say, solar.

The problem with the willingness to change is in the volatility of crypto prices – most projects may simply not be able to change their infrastructure if mining a given token yields little profit.
However, changing laws (going more and more green) will be directed toward making amendments ordering mines to obtain environmentally friendly energy, so we'll see a lot of changes in the coming months and years in terms of greater environmental friendliness.

Historical Bitcoin network power demand 01-2017 → 01-2023



Bitcon network power demand. **Source: Cambridge Bitcoin Electricity Consumption Index**

A selection of projects that are committed to green cryptocurrencies:

Lancium
Responsive Technology. Reliable Grid. More Renewables Growth.Houston-based technology company Lancium has announced plans to spend $150 million on renewable crypto mining companies in 2022.

Crypto Climate Accord
The Crypto Climate Accord organization aims to have all blockchains powered by renewable energy by 2025.

03

Regulated digital currencies: CBDC

What is CBDC

CBDCs are digital currencies of central banks. In the coming months/years, official cryptocurrencies, backed by fiat money, will be the norm for each country. CBDCs are issued and regulated by national monetary authorities or the central bank. Central bank digital currencies are centralized coins and transactions using them cannot be anonymous.

Learn more about CBDCs in our podcast episode where we break down complex tech and Web 3 issues in simple terms:

Jak w Blockchain:
Episode about CBDC (in Polish)

CBDC related projects:

Multiple CBDC Bridge - mCBDC
The Bank for International Settlements (BIS), together with Thailand, Hong Kong, China and the UAE, published in 2021 a report on the second phase of the mBridge project, which aims to create multiple CBDC agreements for a faster, cheaper, better and more efficient mechanism for foreign exchange transfers and operations.

Project Dunbar
The central banks of Australia, Singapore, Malaysia and South Africa, in cooperation with the BIS, have begun testing an international clearing platform as part of Project Dunbar. As of March 2022, the project has successfully built two prototypes to enable international clearing across multiple CBDCs.

Project Helvetica
Project Helvetia was a collaboration between the Swiss National Bank, BIS and commercial infrastructure operator SIX. In 2020. Project Helvetia explored the possibility of issuing wholesale CBDCs on SIX's distributed digital asset platform. In January 2022, it was announced that Project Helvetia was successful in integrating wholesale CBDC into the country's core banking infrastructure.

Project Jasper

In 2017, the Bank of Canada launched Project Jasper, which ended after 4 phases and included cross-border tests with the Bank of England and the Monetary Authority of Singapore.

Project Aber

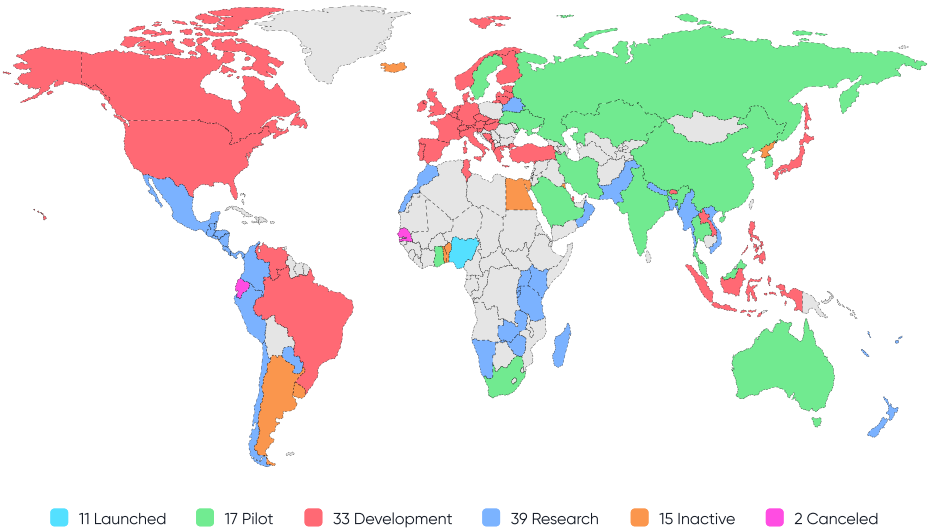
The UAE and Saudi Arabia launched a bilateral CBDC pilot project called Project Aber in 2019 and concluded that decentralized ledger technology can successfully facilitate cross-border transactions.

Project Jura

The Innovation Center of the Bank for International Settlements (BIS), the Bank of France and the Swiss National Bank have launched Project Jura, which, together with a private sector consortium led by Accenture, will experiment with the use of wholesale CBDC (wCBDC) for cross-border settlement on a distributed ledger technology (DLT) platform.

Onyx multiple wCBDC

In July 2021. Banque de France announced the successful completion of a cross-border payment experiment with the Monetary Authority of Singapore that used JP Morgan's Onyx unit.



A regularly updated map of CBDC development worldwide. **Source: Atlantic Council - Shaping the global future together.**

04

Find2Earn: games utilizing blockchain and NFT tokens

What Find2Earn means in practice

Transforming the NFT acquisition process into an augmented reality game is the ultimate opportunity for developers to unleash their creativity. With geolocation and AR technology, users can hunt for NFTs by physically exploring the real world, adding a whole new level of excitement.

Imagine racing around the city with your AR lens or phone in hand, searching for that elusive NFT hidden on the edge of the map. The possibilities are endless, limited only by the developers' ingenuity and technical prowess.

Selected projects with Find2Earn model:

Rebase Portal
reBASE is a blockchain-based platform (formerly known as DROPP) that uses geolocation technology to connect the real world with virtual and augmented reality technologies using the blockchain. ReBASE is in the process of developing the Find2Earn model and has not yet announced specific dates for enabling this form of minting.

Potential Find2Earn view. **Source: Rebase Portal**

05

Prepaid cards in crypto currencies

How do the crypto cards work

Imagine being able to easily spend your cryptocurrency at any store that accepts prepaid cards. That's exactly what crypto cards allow you to do. Simply deposit your cryptocurrency, and in return, receive a prepaid card with the same value in your chosen fiat currency. It's a convenient and user-friendly way to embrace the world of crypto, even if you're new to the game.

Perspectives for prepaid cards in crypto

As regulations and adoption of cryptocurrency payments continue to evolve, prepaid cards offer a promising solution for crypto users. They don't require vendors to change their payment systems, meaning consumers can use them at any store that accepts prepaid cards. It's a win-win situation for both crypto users and retailers alike.

Selected projects using crypto prepaid card concept:

payb.io
A site that allows customers to purchase most products with cryptocurrencies, including prepaid cards - buy anything, pay crypto.

Beegoz.com
Marketplace with selected prepaid cards in Poland.

06

Multi chains bridges: communication between various blockchain networks

Multichain – what is it?

In simple terms, multichain solutions enable communication between different blockchains, similar to how the Internet facilitates communication between computers. By eliminating the need for intermediaries, multichain technology has the potential to revolutionize the blockchain industry and render many single-chain platforms obsolete. This includes interfaces that only allow token transfers between one chain and another, which will be limited in functionality compared to those operating on multiple chains.

Examples of multichain use:

Cross-chain yield farming
Optimized profits through farming and aggregation across multiple blockchain networks, which provide the highest return on assets.

Cross-chain secured lending
Collateral can be deposited in a smart contract on the “native” blockchain, while allowing users to borrow token on a different, higher-bandwidth chain.

New types of DeFi applications
Cross-chain services open up a new category of DeFi applications that can be developed for the multi-chain ecosystem.

Low-cost transaction calculation
Transaction data can be processed on a high-bandwidth chain, and the subsequent calculation results can be sent to a more expensive but more trusted network for transaction settlement.

Fungible multi-chain tokens
The ability to create tokens on different networks in a single project so that they interoperate with each other.

Multi-chain NFT's
Creating and developing NFT projects on multiple networks, ability to flip a series of NFTs from one network to another.

Selected real-life projects using multichain bridges:

ChainLink
ChainLink initially functioned as a middleware between the smart contract and the external data sources necessary for its operation. However, an offshoot of the project has emerged, providing multi-bridging in various aspects. The Cross-Chain Interoperability Protocol (CCIP) provides developers with an universal, open standard for creating secure services and applications that can send messages, transfer tokens and initiate actions across multiple networks. With an universal messaging interface, smart contracts can communicate across multiple blockchain networks, eliminating the need for developers to write custom code to build blockchain-specific integrations. CCIP opens up a new category of DeFi applications that can be developed by developers for the multi-chain ecosystem.

Multichain - Cross Chain Router Protocol (CRP)
Multichain (a project born from Anyswap) is a multichain platform for cryptocurrencies and NFT's. The solutions developed by Multichain allow almost all blockchains to interoperate. For coins that have native tokens on multiple chains, Multichain will exchange cryptocurrencies between chains using liquidity pools. If there is no such native coin, Multichain locks the token in a smart contract and mints the pegged token on the target chain.

LayerZero
LayerZero is an interoperability protocol designed to transport messages between blockchains. Simply put, LayerZero is a layer that allows message transport for smart contracts to communicate between chains. It works as a collection of smart contracts on any supported blockchain. It is worth mentioning that the developers of LayerZero have created the Stargate project - a liquidity transport protocol using LayerZero.

THORChain.org

THORChain is a decentralized liquidity protocol that enables exchanges between 7 chains, including Bitcoin, Ethereum, Binance Chain, Dogecoin, Litecoin and Bitcoin Cash. THORChain is backed by its native RUNE token, which deterministically accrues value as more and more assets are deposited on the network.

THORChain does not wrap assets before swapping; instead, it uses native assets in THORChain. In 2021, THORChain suffered an attack that resulted in a loss of $4.9 million. The network, faced with the theft, decided to stop operations (it has the ability to do so if 1/3 of the nodes give the command) and implement security patches.

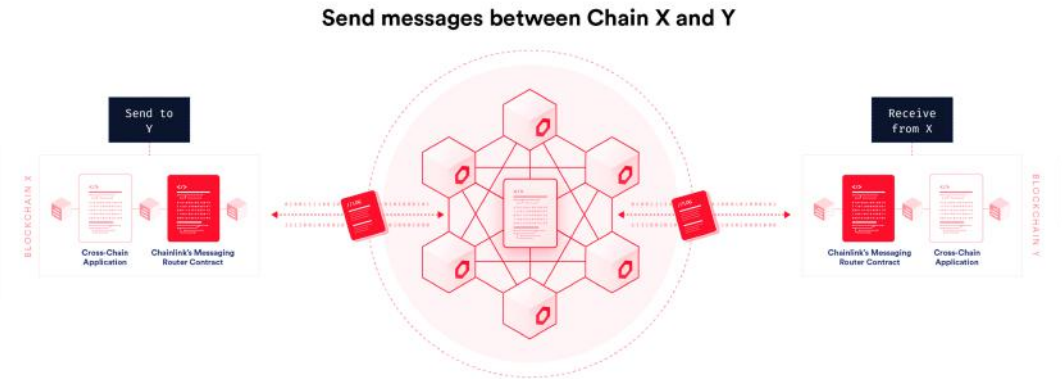
Omnite - Home of Upgradable Assets

Omnite is a Layer 1, smart-contract-based protocol that allows NFT tokens to be transferred between blockchain networks in a decentralized manner without the need for a centralized intermediary. The platform works on all leading EVM networks such as Ethereum, Polygon, Avax, Fantom and BSC. When changing networks, token addresses on different networks remain the same.

Rango Exchange

Rango exchange is a Dex that supports multiple networks. Rango is an aggregator that can perform complex and multi-stage exchanges, combining all DEXs, bridges and DEX aggregators across the DeFi world, including:

- DEX: Uniswap, Sushiswap, Bancor itp.
- DEX Aggregators: 1inch, Matcha etc.
- Cross-Chain DEXes, such as: Thorchain.
- Centralized/decentralized bridges: Binance Bridge, Terra Bridge, etc.



The Cross-Chain Interoperability Protocol. **Source: Chainlink**

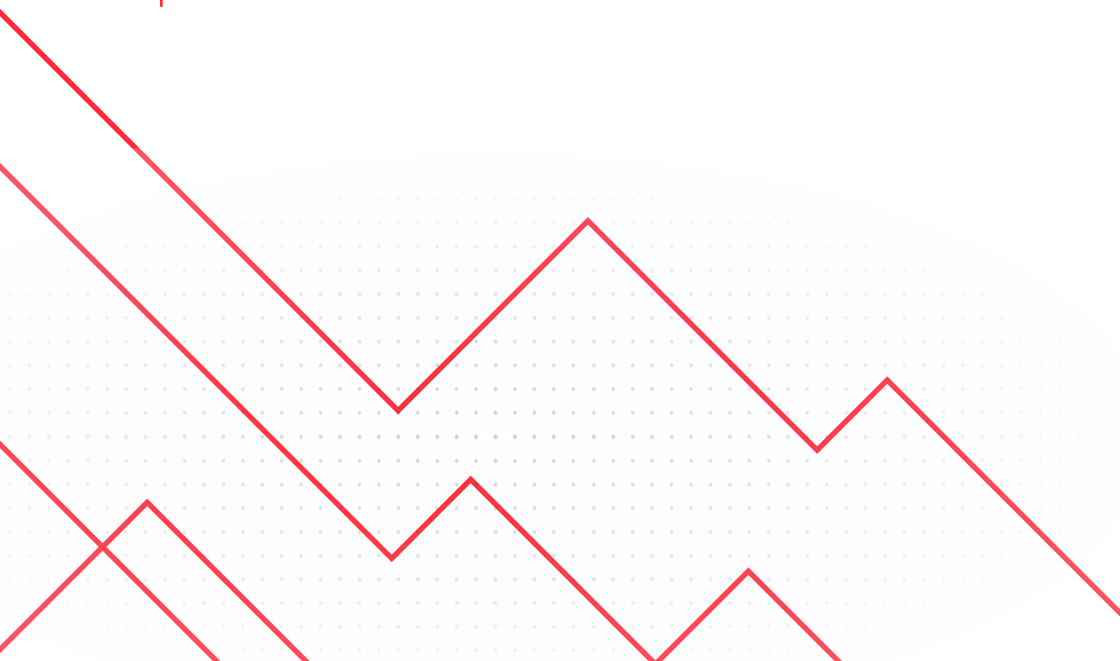
Section 2.

Future-ready industries. Explore branches are bound to be reshaped by blockchain

Blockchain technology is taking industries by storm, turning them upside down and revolutionizing the way they operate.

From healthcare to real estate, cyber security to education, supply chain and logistics to IoT, blockchain is proving to be a game-changer. Its impact is undeniable and its potential for innovation is limitless.

Find out which branches blockchain may soon change beyond recognition. You will also learn about examples of projects where bold ideas for using this technology have already been successfully implemented.



01

AI and blockchain: the dynamic duo of the tech world

Pairing of AI and blockchain – what does it offer?

The reputation of artificial intelligence precedes it, and probably no one needs any further persuading that it is a prospective topic. At the turn of 2022 and 2023, AI gained extraordinary momentum and we can now see a veritable explosion of bots and AI-based applications.

Together with blockchain, they make up the 'royal couple' of the technology world and jointly they can conquer the world. The common denominator of both technologies is working with data. AI and blockchain work perfectly together in this regard.

Artificial intelligence is great at analytics – it brings in intelligent automation. Blockchain, on the other hand, provides an element of certainty and security: it provides us with the peace of mind that our data is secure and that it is trustworthy.

In what areas will the combination of AI and blockchain be successful?

The belief that the data on which AI works so effectively is reliable and secure is extremely valuable, especially as this combination of technologies has great potential for growth in industries that use sensitive data, such as medicine, healthcare or finance.

So what are the three magic words that perfectly capture the power of this partnership? Read on to find out. It's no wonder they sound like a slogan for a revolution – because that's exactly what this duo is bringing to the table.

The strengths of the combination of AI and blockchain

Authenticity By leveraging blockchain's ability to provide a transparent and immutable record of data, the integration of blockchain and AI can help address critical issues such as data integrity and security. Storing and sharing AI models on a blockchain ensures a clear audit trail and improves confidence in the recommendations made by AI. This powerful duo offers a game-changing solution for businesses seeking to enhance their data-driven decision-making processes.

Augmentation Artificial intelligence can comprehensively read, understand and correlate data at incredible speeds, bringing a new level of intelligence to blockchain-based business networks. It provides access to large amounts of data from within and outside the organisation, while helping to scale artificial intelligence to provide more actionable insights, manage data usage and model sharing, and create a trustworthy and transparent data economy.

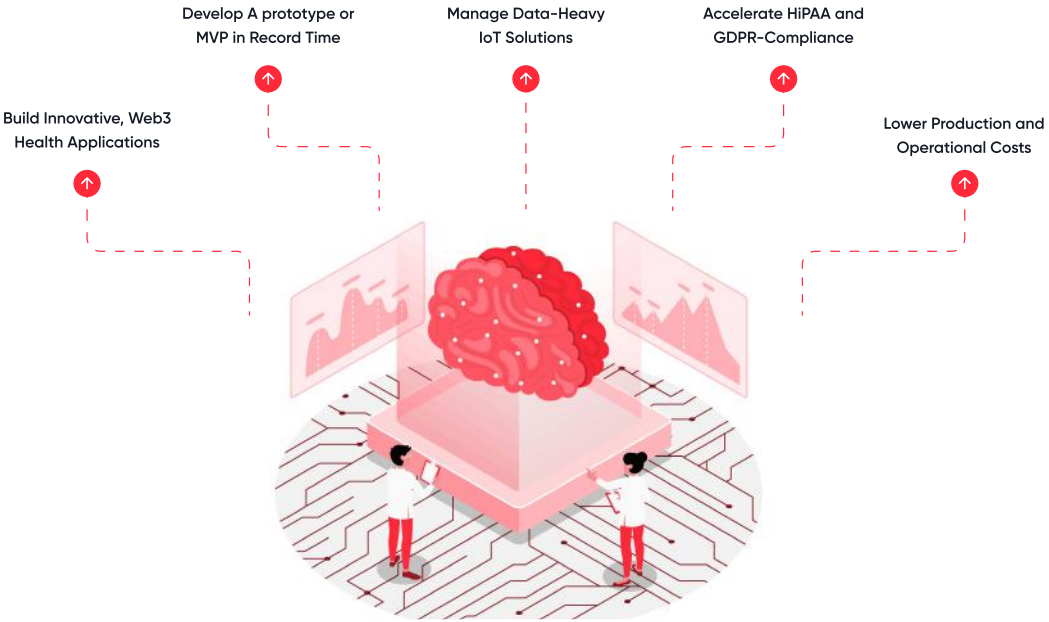
Automation Unlocking the power of AI, automation, and blockchain can revolutionize business processes, driving efficiency, speed, and growth. Imagine AI models embedded in smart contracts on the blockchain directing product recalls, resolving complaints, and even selecting the best shipping methods. By automating workflows and removing bottlenecks, these technologies can streamline operations, execute transactions, and make data-driven decisions faster than ever before.

Selected projects combining blockchain and artificial intelligence:

Burst IQ
A platform using AI and blockchain to provide healthcare professionals with access to patients' data. It also enables the management, sale, exchange of medical information for scientific research.

Elblox
A p2p platform connecting local energy producers with consumers, allowing them to choose the best deals from different suppliers. Thanks to blockchain, data on the amount of energy produced and consumed is recorded and available to each party.

Atende
Smart prepaid meters with light nodes, allowing users to conveniently recharge and control costs.



Burst IQ - a platform using AI and blockchain in the healthcare industry. **Source: Burst IQ**.

02

Smart cities, or the Internet of Things and blockchain for metropolitan residents

What is a Smart City

The smart city concept involves the fusion of information and communication technologies (ICT) and the Internet of Things (IoT) to facilitate automated and efficient city management, improving service delivery to citizens and optimizing resource allocation to yield significant cost savings.

How Blockchain can help the Smart City

Cities can leverage existing IoT connections that are already involved in providing the smart city standard. All of these devices collect large amounts of data, which can successfully be stored on blockchains in a secure way.

What areas can blockchain support Smart Cities in?

Pedestrian traffic and transport

Blockchain together with the Internet of Things will improve the management of vehicle and pedestrian traffic as well as public transport. IoT and blockchain-based applications can support authorities in making decisions about route planning or timetables. Thanks to blockchain technology, huge data sets can be collected and these will provide valuable historical information. The data stored on the blockchain cannot be tampered with, which translates into reliable analysis and trustworthy conclusions.

Waste management	Blockchain together with and IoT can support waste management by providing transparent data on the amount, transport and recycling of waste.
Administration and the everyday life	The potential of blockchain combined with IoT can be used to monitor and manage any other residents' data, such as on health or vehicle registration, increased traffic, air quality.
Smart energy	Blockchain has the potential to simplify energy production and optimise electricity, water, gas consumption and improve resource management. The transparency offered by blockchain-based solutions can support openness and efficiency in transactions, regulations and energy distribution. Data from energy management systems can be stored securely through blockchain and provide a reliable source for demand and supply analysis.

Selected smart city projects based on blockchain:

Reno

The city of Reno (USA) intends to create a register of historic places using blockchain technology. It is intended to streamline the approval process for changes to historic buildings. The system will be implemented by BlockApps.

Miami

Miami will implement an air quality monitoring system built on Algorand. The solution, developed by French company Planetwatch, involves the deployment of a network of sensors operated by volunteers who will be automatically rewarded for the data they send.

03

Fashion blockchains in fashion

Haute couture based on the blockchain

The fashion world is increasingly keen on metaverse and advanced technologies. In terms of blockchain, the technology can be used to link digital and physical products as an NFT token, allowing holders to freely trade the product online as an NFT before taking delivery of the physical piece. Plus, designers can even offer NFT-based avatar and character redesigns as part of their services. And let's not forget about the exciting possibilities of creating 3D images, interactive exhibition halls, and AR filters within the metaverse, all made possible with non-fungible tokens.

Prêt-à-porter based on blockchain

Blockchain technology offers a groundbreaking solution for the fashion industry, allowing designers to create and sell digital designs as NFTs, enabling customers to purchase and trade these unique pieces prior to their physical release. By doing so, the industry can significantly reduce production costs and gain valuable insights into market demand. Additionally, digital collections can offer exclusive experiences and products, effectively functioning as membership cards. The future of fashion lies in the integration of blockchain technology and NFTs, transforming the way we consume and experience fashion.

Selected projects combining blockchain and fashion:

Metaverse Fashion Week
A fashion week organised by Decenterland that showcased digital collections from 50 brands, including Paco Rabanne, Tommy Hilfiger, Elie Saab, Dolce & Gabbana.

NIKELAND

Nikeland is a Nike-branded metaverse created on the Roblox gaming platform. Nike also owns RTFKT, the studio that creates NFT shoes.

NTZNS

NTZNS is a fashion brand creating digital clothing for both real-world influencers and avatars.

1

Choose your photo you want to dress

2

Choose your favorite digital cloth from NTZNS store

3

Upload your photo and make the purchase

Outfit for avatar available on NTZNS. Source: **NTZNS**

04

Get in the game with blockchain technology in sports

What blockchain can accomplish in sport

Sports and blockchain are a winning combination, delivering game-changing solutions for athletes and fans alike. Sport is an industry that brings together a huge community. From data processing and equipment sales to collectibles and events, blockchain has found a home in the world of sports.

Get paid to move: the future of fitness

Blockchain and GPS technologies are at the heart of projects enabling people to monetise their movement, such as run2earn or ride2earn. All you need to do is buy an app and relevant NFT items (e.g. shoes) to earn by moving. Workout2earn works similarly, relying on equipment that measures your heart rate and rewards you for physical activity.

Secure sports data analytics

Data analysis is an important element in sport. This applies to the performance reports of individual athletes, professional and amateur, as well as the performance of entire teams and clubs. The data collected translates into better adapted training plans, player settings (such as in baseball, where small changes in the batting angle make a big difference to statistics), and better results. Data collected by clubs can constitute intellectual property, and athletes' biometric information should be protected as personal health data. And where large data sets and long-term analysis come into play, and the need for secure storage and transparency, that's where our super hero comes in: blockchain.

Join the team: loyalty and fan engagement

Blockchain-based platforms are used to build and animate dedicated fan communities. Supporters or active enthusiasts of a particular sport can be rewarded for specific actions, such as creating and sharing media content. They can also participate in loyalty programmes, collecting points and rewards that are later redeemable for tickets or digital collectibles.

Collectibles, cards and NFTs

Digital collector items are based on NFT technology, or non-fungible tokens. These are unique and often scarce items whose uniqueness is guaranteed by blockchain technology. Thanks to this, clubs, sports teams can sell digitally linked cards, in-game assets (also in esports), memorabilia from matches played (such as balls from the Italian Super Cup in 2022), which fans can purchase, exchange or treat as an investment.

Selected projects featuring sport and blockchain:

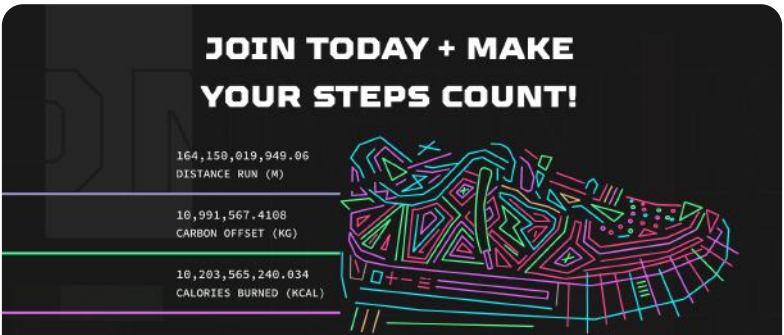
Socios
In the project, fans were able to purchase NFT tokens that corresponded to the tagged balls that scored during the 2022 Italian Super Cup final. The match ended with a score of 3:0, so three unique tokens went on sale.

Sorare: Own Your Game
A fantasy football game that involves collecting footballer cards saved in NFT form and participating in tournaments.

STEPN
A fitness app that allows you to earn money by moving around. This requires the purchase of shoes (in the form of NFTs), the parameters of which affect the speed of your profits. Movement is monitored through GPS data.

Sportmonks
A service that uses the Chainlink node to provide sports data (such as team statistics, players, bookmaker odds, etc.).

STEPN's digital NFT shoe that enables users to take part in a move2earn activity. **Source: STEPN**



05

Blockchain: the healing code for modern medicine

Blockchain has the potential to bring significant benefits to the healthcare industry and improve the quality of care for patients. Why?

There are many reasons, and the most compelling arguments for it have already been mentioned: transparency, trust, automation. Blockchain is poised to revolutionize the healthcare industry by enhancing the precision, confidentiality, and security of patient data. By leveraging the power of smart contracts, blockchain can also streamline many of the administrative tasks.

automation

transparency

trust

Medical records and blockchain

Health data, includes general information such as age, gender and potentially basic medical history, vaccination history or body parameters. None of this information on its own could be used to identify a specific patient, prompting the need to store it on a common blockchain that can be accessed by multiple people without privacy concerns (in most cases).

Medical data management and blockchain

Storing individual medical data on a blockchain can facilitate our transfer between different medical institutions. It will eliminate the problems of relocation to another clinic. Collecting and storing the generated data on the blockchain will provide automation and security for the documents.

Vaccine certification and blockchain

Concerns about the production and sale of fake vaccines have been a complex and massive problem in managing the global pandemic. In such cases, blockchain can serve as an ideal tool to verify the authenticity of vaccine shipments. In addition, blockchain can also help track the distribution of vaccines to ensure that vaccines reach the desired destinations. Another promising highlight of the future of blockchain in vaccine production and distribution will be the verification of vaccine integrity at various points in the supply chain. For example, blockchain technology can help ensure that batches of vaccines are stored consistently at the right temperature.

Selected projects combining medicine and blockchain-based solutions:

WholeCare Hub

The WholeCare platform brings together information about care plans, medication protocols, appointment setting and quality resources on a platform that allows individuals, support systems and multi-care facilities to better understand how to provide personalized care. The system is built on the blockchain network to be as secure as possible. WholeCare provides HIPAA-compliant record keeping.

Patientory

With Patientory, a patient's medical history, records, current providers and, most importantly, everything a healthcare practitioner needs to know is constantly and securely available. The blockchain platform allows patients and doctors to stay in constant communication, and the constant stream of medical data allows any doctor to quickly and securely diagnose patients based on a clearer medical history.

Nebula Genomics

Nebula Genomics aims to understand the human genome and make personal genomics more affordable. The company's whole genome DNA sequencing tests are the only tests available that decode 100% of a person's DNA. All information collected from a single test is completely anonymous and kept confidential thanks to access restrictions written into smart contracts, so user data will theoretically not be identifiable and stolen (by outsiders).

Medicalchain

Medicalchain's blockchain is used to verify whether a patient is covered by health insurance. In addition, it shows patients' medical records and identifies key candidates for various tests.

Interface of the blockchain-based platform for Patientory medical records. **Source:Patientory**

06

High tech and education? This makes sense

What blockchain can bring to education

Blockchain-based solutions are set to transform the education industry by elevating the accuracy, security, and privacy of student data. In traditional as well as online schooling, the storage and issuance of certificates of knowledge like diplomas, grade and attendance records will be key areas for this innovative technology. The future seems to be in tokens that authenticate skills acquired by individuals.

Tokens with soul instead of a CV

The future of digital identity lies in soul-bound tokens that combine multiple tokens into a single wallet. Such tokens will comprise certificates of completed education or work experience issued by universities or colleges. They serve as an extended CV, with a collection of verified and dependable information, highlighting an individual's educational history. This method provides advantages over the traditional 'diploma' model for numerous reasons.

Advantages of Soul-bound Tokens in Education:

- Comprehensive Information: Soul-bound tokens can contain more information about a learner's educational journey, including work samples and teacher comments.
- Greater Control: Learners have the flexibility to choose which parts of their learning chain they want to share publicly or privately.
- Automatic Analysis: Tokens can indicate important factors such as illness, which may have affected a learner's academic performance.
- Holistic Assessment: Tokens awarded by teachers for achievements or projects can provide a more insightful and comprehensive assessment of the student's skills and knowledge.
- Enhanced Verification: Employers can easily verify the skills and additional courses completed by a candidate, making the hiring process more efficient and effective.

Selected projects using blockchain in the education industry:

Acadex Network

Acadex describes itself as a decentralised learning point based on blockchain, metaverse and NFT. The platform is expected to combine multiple functionalities such as:

- remote learning (Academa),
- payment system,
- student loans,
- NFT certificates/diplomas,
- NFT library and learning awards (Proof of Knowledge).

The academy at the core of the whole concept is to be an educational hub for lecturers, creators, teachers and students. Virtual reality technology is to be used within the lessons to make the teaching of knowledge more accessible and effective, both by tutors and with the use of advanced tutorials.

07

Blockchain-enriched agriculture

Which areas of agriculture can be enhanced by blockchain

Blockchain-based agriculture and food supply chain are forecast to experience a compound annual growth rate (CAGR) of 7% for this market between 2021 and 2028. Why so much interest in blockchain among farmers? Blockchain technology can bring a lot of value and improvements to farming operations.

Supply chain

The combination of the Internet of Things and blockchain technology can significantly improve the supply chain. The optimisation of the supply chain is expected to come from quick access to information about the origin of the product, the inventory status or to transport tracking. Data stored on the blockchain will provide a comprehensive, secure and reliable source of information for analysis.

Insurance policies

Blockchain means security not only in data protection - it can streamline crop and harvest insurance matters. Automation and smart contracts will influence a fairer and more efficient selection of policies or a lowering of premiums. This will come through the use of geolocalisation and weather information, as well as automation and smart claims payments. Examples include automatic payments without intermediaries or claims submission when a specific scenario covered by a contract provision occurs.

Trading

Blockchain has huge potential in this area. It can significantly improve sales by directly accessing target customers without the need for intermediaries. The absence of additional transaction fees means more money in the pockets of counterparties.

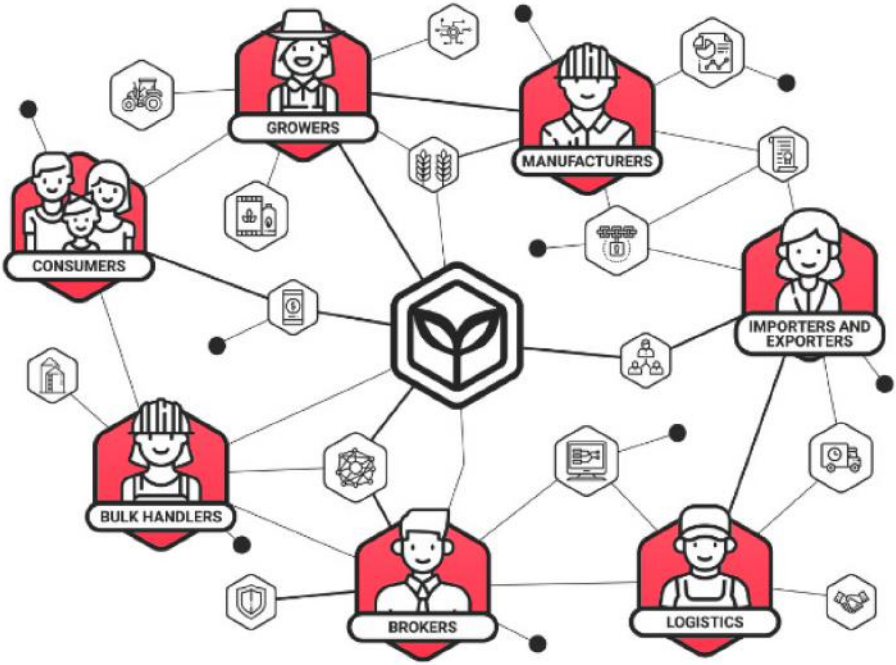
Selected blockchain projects in agriculture:

Etherisc
A decentralised insurance platform offering, among other things, smart insurance contracts for farmers, using weather data relevant to the policy taken out and automatically paying claims.

Agrichain
A platform for transferring information and connecting participants in the supply chain. Enables farmers and growers, as well as intermediaries and logistics companies, to make more informed decisions. Increases the efficiency of inventory management and reduces unnecessary documentation.

Lemonade Crypto Climate Coalition

A platform of insurance and blockchain companies set up to provide affordable insurance for farmers in economically and climatically challenging areas (e.g. Africa). The coalition aims to offer farmers parametric insurance, in which compensation is paid when a contractually defined incident (e.g. a set level of rainfall or lack thereof) is recorded. The affected parties, therefore, do not have to report anything, the payment will be made automatically. This is all thanks to smart contracts and using weather data.



Application of blockchain technology in agricultural supply chains by Agrichain. **Source: AgriChain**

08

The power of two chains: blockchain-backed delivery

What the combination of blockchain and supply chain offers

Where blockchain and supply chain combine, the space for weak links shrinks considerably. The immutable nature of blockchain makes it well suited to tasks such as tracking goods in real time as they move and change owners throughout the supply chain. It ensures that the data collected is reliable and fraud-proof: the data cannot be tampered with or altered.
Using the blockchain opens up several opportunities for companies transporting these goods. Blockchain entries can be used to queue events in the supply chain - for example, allocating goods newly arriving at the port to different transport containers.

Selected projects linking blockchain and supply chains:

CargoCoin - Blockchaining Logistics
A platform aimed at optimising the entire process of transporting goods by integrating different modes of transport (land, sea, air) with the activities of freight forwarders and freight exchanges. In addition, the service provides tools for document exchange and real-time payments, with low commissions. Full functionality is expected to be possible in the second half of 2023.

Everledger
A tool using blockchain to monitor the life cycle of products, mainly precious stones, wines, artworks and other luxury goods. The programme tracks the history of a commodity from the production (or mining) stage through successive operations, transactions and up to the final recipient. In the case of diamonds, the client receives complete information on the origin and previous owners of the gem, as well as its weight, colour and clarity.

Skuchain: Currency Agnostic Blockchain for Global Trade

A service that secures business-to-business commercial transactions with smart contracts. Receivables for transactions are transferred to the selling party upon delivery of the goods. In addition, the system facilitates inventory tracking, order and contract management providing greater transparency and supply chain efficiency.

Maersk | Integrated Container Logistics & Supply Chain Services

Maersk has joined forces with IBM to bring blockchain to global trade. Both companies will use blockchain to better understand the supply chain and digitally track goods across international borders in real time.

ShipChain

ShipChain is a blockchain-based system that handles the entire shipping process. From the moment a shipment leaves the factory to the moment it arrives at its destination, the logistics ecosystem securely tracks and documents every movement, creating a transparent ledger.

09

Blockchain in the service of cyber security

Cyber attacks affect small and large players: even such bigwigs in the digital world as Google and Amazon have not escaped hacker attacks on their servers. These were DDoS (distributed denial-of-service) attacks that took advantage of the decentralised nature of the network: this allowed the cyber villains to remain anonymous and defeat security.

Why blockchain is a good solution for digital security

Interestingly, blockchain is a very effective panacea against attacks by hackers, fighting them with their own weapons. This is because blockchain is so effective due to similar characteristics: distributedness, decentralisation and consensus methods. When using the Proof of Work method, hackers need to gain control of a large proportion (51% attack) of nodes, which translates to huge computing power, high energy requirements and massive costs. And the larger the blockchain network, the more difficult it is to launch an attack.

In which areas blockchain and cyber security make sense

The high level of security that blockchain offers can find application in many projects such as:

- Identity protection (DID, Verifiable credentials).
- Keeping messages secure.
- Creation of secure databases and analyses using Artificial Intelligence.
- Protection of data and its transmission.
- Protection against DDoS attacks through DNS decentralisation.
- Authentication of IoT software and devices, e.g. update protection (against attacks by malicious updates).

Selected projects combining blockchain and cyber security:

Hypr
A 'passwordless' authentication service using mobile devices. The platform runs on Windows, macOS, Linux and also supports virtual desktops. Effectively eliminates hacking attacks such as 'man in the middle', PUSH or credential stuffing.

Xage Security
A blockchain-based suite of solutions for user, application and device security (also for IIOT, or industrial IoT). The service allows identity and access management with zero trust, protecting existing systems and data. In 2022, Xage received USD 8 million in funding and a total of USD 59 million, further confirming investor interest in the development of the cyber security area.

Microsoft Entra

The service, thanks to its decentralised system, is expected to provide rapid verification of credentials. The solution is expected to eliminate the proliferation of identity data among service providers and give individuals and organisations full control over the information they share. Although the service is new, the concept of decentralised identifiers (DID) has been developed previously by Microsoft ION. Elements of it are also planned to be used by Jack Dorsey in his 'Web 5.0' concept.

<16%
of organizations have multi-factor authentication that eliminates shared secrets

34%
of organizations reported credential stuffing attacks

UP **17%** from 2020

64%
of companies kept thier password approach even after attack

96%
of IT & security professionals want standards-based authentication

Results of Hypr's 2022 report on the state of conventional and passwordless authentication in companies. **Source: Hypr**

The modern real estate market powered by blockchain

Technologies for tokenisation of the real estate market

Blockchain technology has created the possibility to invest in real estate using tokens, such as NFT (non-fungible token). Through the tokenisation process, also based on blockchain, we are able to transfer assets to the digital world. The NFT, non-fungible token, in simple terms, serves as a digital proof of authenticity that an asset belongs to a specific person. This allows digitised assets to be traded and circulated online.

Why blockchain and NFT work well in the property market

Acquiring real estate involves large expenses in one go. Real estate tokenisation means creating tokens on blockchain and assigning them to real value in the form of existing properties. Tokens can act similarly to shares, but also serve as a means to raise capital for development investments, giving more investors the chance to participate in the venture: investors are not limited by portfolio size and location.

Less paperwork: smart and secure contracts

With blockchain-based platforms, we gain the ability to execute transactions without intermediaries and without the use of paper documentation. Distributed Ledger Technology (DLT) makes it possible to carry out an investment transaction in a secure manner. Moreover, it can provide anonymity for both parties (the exception may be tokens acting as shares, which require identification of the buyers).
Transactions can also be more automated and executed securely, including at a distance. All this means a much faster, easier and transparent investment process with relatively low risk. Such a convenient method of transaction, without intermediaries and in a way that ensures reliability and security, can be used not only for property purchases, but also for long-term and short-term rentals.

Real estate in Web3: metaverse projects

Blockchain helps to purchase real estate not only in the real world, but also in the metaverse. It is already possible to create virtual plots of land in the form of NFTs. One example is Decentraland, a virtual reality platform built on blockchain that allows users to buy and sell digital real estate. Big brands are following this trend and are keen to create their headquarters in the meta world. It is very likely that we will see projects like Sandbox and Decentraland (both companies reached multi-billion dollar valuations during the 2021 bull market) develop over the next few years, until every well-known brand owns its parcels of land in the metaverse in the form of NFTs or soulbound tokens.

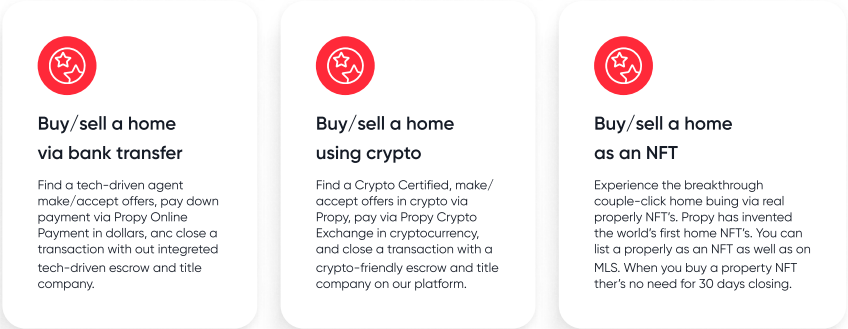
Selected projects linking blockchain and real estate:

Propy | Real Estate Transaction Automated

A platform using smart contracts and NFT to automate real estate sales. The service allows secure purchase and finalisation of transactions through integrated contract signing and payment systems.

HomeJab

The service offers two types of service: the taking of professional real estate photos and a marketplace that allows you to buy a house as an NFT (including payment).



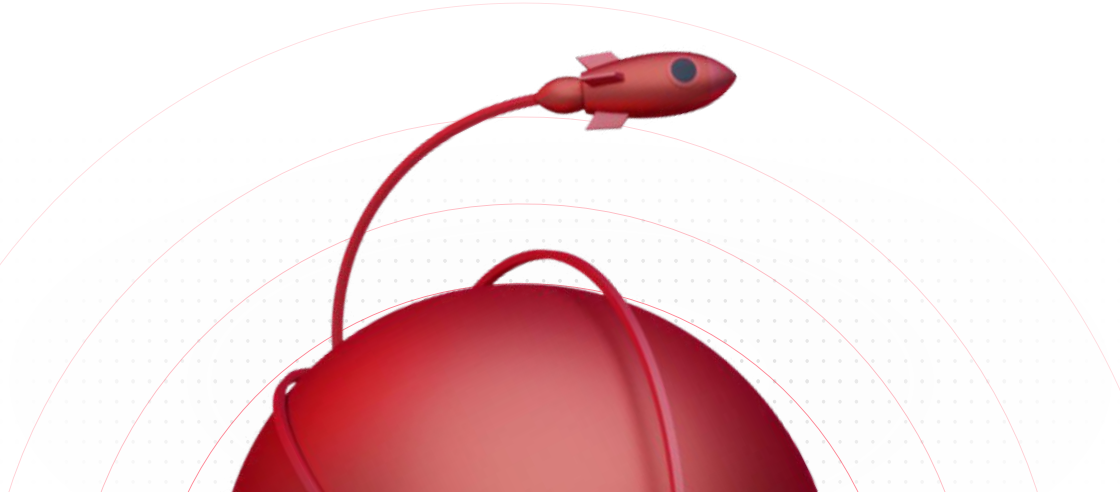
Selected tech-driven features offered by the Propy platform. **Source: Propy**

What's in store for blockchain

Blockchain has consistently made its way into more markets, often reshaping them beyond recognition. It is hardly surprising that almost every sector is reaching out for the unique benefits of blockchain technology.

Blockchain is an open, decentralised ledger that permanently records transactions between two parties. All of this eliminates the need for third-party authentication.

The credibility, transparency and reliability are solid reasons to expect that we will see numerous new opportunities for blockchain use in various industries in the near future.



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