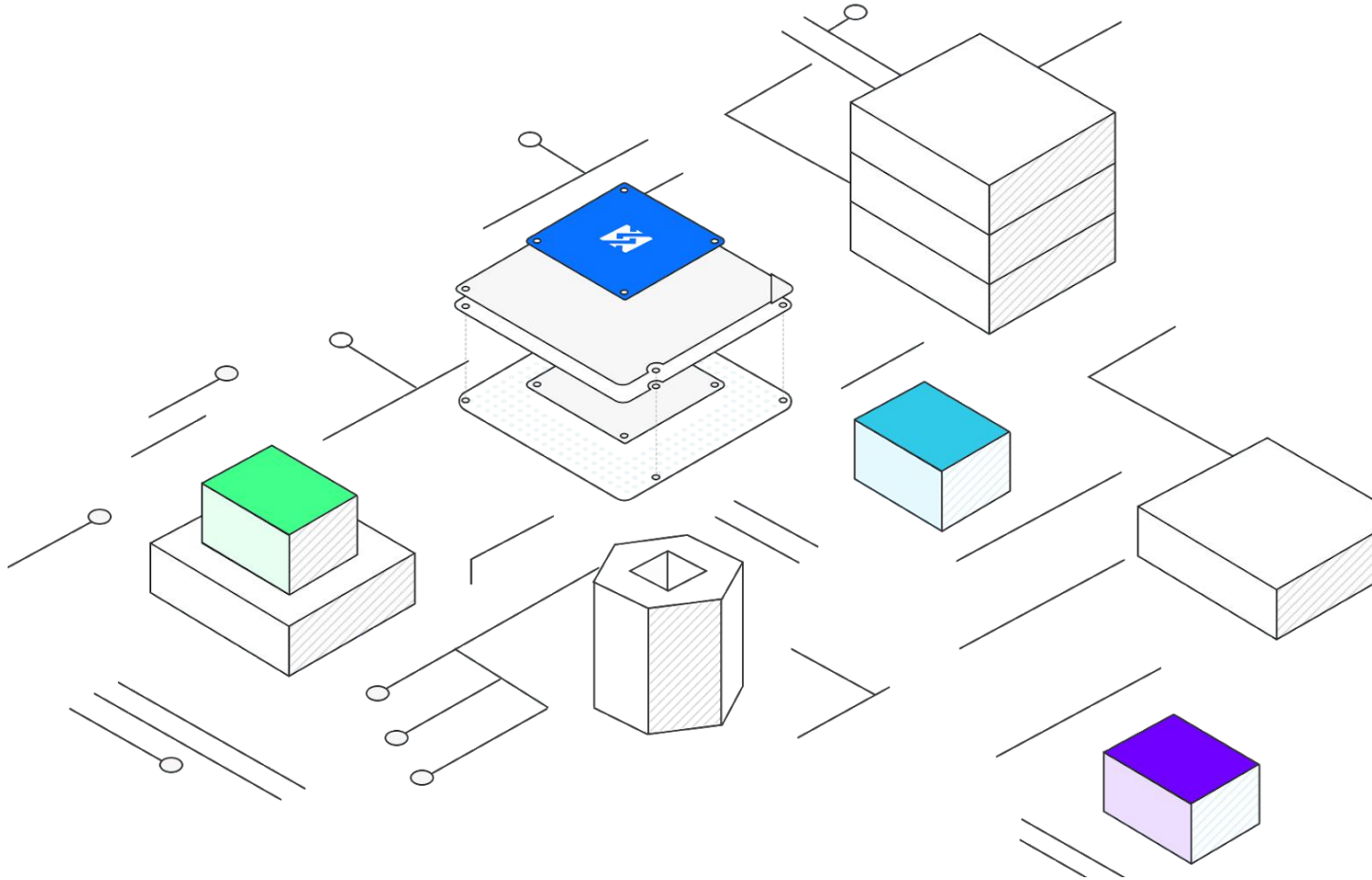




# Oxcert protocol

Whitepaper 0.4 (draft)



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<sup>1</sup> This version and its contents are current as of 2018-07-05 and supersede all previous versions of this Whitepaper or any public statements made about Oxcert and the ZXC Token Sale and are subject to change. This English version is to be relied upon as the most accurate and updated as other language translations may have mistranslations and be outdated.

# Abstract

Create, own, and validate unique assets on the blockchain with Oxcert - **the first open protocol** built to support the future of digital assets, powered by non-fungible tokens.

The Oxcert protocol offers **tools for building powerful dapps**, aimed at easy authentication and management of digital or real-world tangible assets (such as ID, educational certificate, in-game item or a house) on the blockchain. In addition to common functions for transferring and managing standard non-fungible tokens, the Oxcert protocol provides **another layer of conventions for creating certified non-fungible tokens for unique assets**. These tokens are called Xcerts and are created through a custom minting process. Xcerts represent opinionated non-fungible tokens, which also hold an imprint of an asset. With Oxcert protocol, we can validate a proof of existence, authenticity and ownership of these digital assets without third-party involvement.

Due to the complexity of low-level blockchain solutions, the wide adoption of non-fungible tokens and blockchain in general is slower than it could be. The lack of conventions prevents interoperability among applications. Developers trying to develop their own decentralised application using non-fungible tokens face long development time and huge risk in their development process and security, lowering the overall efficiency and adoption rate. The resulting ecosystem of digital assets is under risk of being fragmented, with non-interoperable dapps and underlying data. One of the major problems in the future may not be the technological barrier to issuing ownership rights of different unique assets on the blockchain, but rather the authenticity of issuing entities. Currently there is no mechanism to attest credible NFT issuers.

The vision of Oxcert is to provide an **open protocol for standardized and certified non-fungible tokens to a wider tech audience**. With Oxcert, you can build on top of the non-fungible token standard, employing a **complete toolset, development framework, and a set of conventions for various use cases**. This results in shorter development time, lower risk and cuts cost associated with developing blockchain solutions. A wide range of decentralized applications and business models can be supported, giving companies the power to fully utilize the potential of blockchain technology. Oxcert is an

open source protocol that translates one-of-a-kind digital or real-world assets into non-fungible tokens (NFTs) - unique proof of ownership available from the blockchain.

Oxcert is a framework with a set of on-chain and off-chain rules for managing Xcerts and other standard non-fungible tokens. Our mission is to equip application developers with a secure blockchain agnostic platform, powerful tools and community embraced conventions for managing non-fungible tokens. Oxcert is a pluggable settlement with an advanced integration layer for different dapps and relay applications. This enables developers to focus on the application layer and quickly build applications for issuing university certificates, KYC applications, applications for loyalty programs, warranties, badges, credits or even a decentralized non-fungible exchange.

A key role in the Oxcert infrastructure is played by the ZXC utility tokens. These are fungible tokens that are compliant with Ethereum's ERC-20 standard. The ZXC token will be utilized to support dapps built on top of the Oxcert protocol with minimum possible fees. Since Oxcert is an open source project that strives to be community driven, a decentralized governance model could be introduced as well.

We recognize that one of the fundamental problems in the blockchain space may become the authenticity of issuers in the future. A decentralized issuer verification registry may be an acceptable and self-sustaining solution to the problem. The community would have an option to either verify or reject new Xcert issuers through a staking and rewarding mechanism based on the ZXC token.

Furthermore, Oxcert is also building out a whole ecosystem of parties involved in the non-fungible space, as well as specific application developers, companies from various verticals, researchers, organisations and communities. Planned growth activities will not only positively impact and extend further adoption of technologies developed by Oxcert, but also expand the scientific horizon of non-fungible tokens in general.

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Statements made in this Whitepaper are based on the law and practice currently in force in Slovenia, which is a country in the European Union and are subject to changes in accordance with said laws.

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# 1. Introduction and Vision

We are living in one of the most exciting times since the beginning of the Internet. The advent of blockchain has redefined technology and set the course for the future of everything. Banking, insurance, advertising as well as many other industries are adopting this new paradigm of governance through a new concept introduced by Satoshi Nakamoto back in 2007.

Although blockchain's utility has expanded to numerous use-cases, the core value of the technology remains. It is a tamper-proof, transparent and secure decentralized ledger that maintains a list of records that cannot be altered retroactively. Blockchain was first built for the financial capital; now it is ready to take on social and professional capital: achievements, qualifications, accreditations, credentials and certification.

**But the really exciting paradigm shift comes with blockchain's ability to tap into the physical world.** With the introduction of unique decentralized assets presented as non-fungible tokens<sup>2</sup>, the idea of storing intangible assets such as copyrights, patents and goodwill, as well as tangible assets such as property, equipment and inventory is now possible like never before.

With the emergence of different business opportunities related to the tokenization of physical assets, there is a **growing need for standardization and a base protocol that would allow for simple proof-validation of its existence, authenticity and ownership.** Furthermore, the future of a new technology of this magnitude should be made available to everyone.

**The vision of Oxcert is to provide an open protocol for non-fungible tokens to a wider tech audience. With its help, we can drastically shorten development time, decrease risk and cut costs associated with developing blockchain solutions.** A wide range of decentralized applications (dapps) and business models can be supported, giving companies the power to fully utilize the potential of blockchain technology. Non-blockchain companies will be able to make use of a decentralized and distributed ledger to easily incorporate the non-fungible technological features into their applications while not requiring their development team to be proficient in low-level blockchain programming.

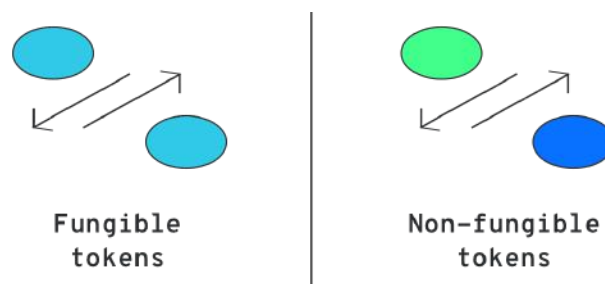
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<sup>2</sup> E.g. ERC721 standard on the Ethereum blockchain.

Blockchain is moving faster than anyone dared to predict. With the Oxcert protocol, we are opening the door for all in this important time in history, where everything you own, not just financial assets, will now have a way to exist securely in your digital wallet.

## 2. Opportunity

The most common tokens of today's crypto economy follow the Ethereum's ERC-20 specification. These tokens are used for a specifically defined utility within predefined systems and thus carry value. Tokens that are issued by the same source are identical and mutually interchangeable. This characteristic is called fungibility, hence these tokens are called fungible tokens. Token holders can buy and sell these tokens on exchanges, which is also the primary mechanism of their price valuation.



Recently, another form of tokens, called **non-fungible tokens (NFTs)**, started getting attention in the crypto community. Non-fungible digital assets represent the next stage in the blockchain evolution. The first good use case for NFTs was introduced with CryptoKitties. These were one of the first popular crypto-collectables: assets that were unique and could be stored in your Ethereum wallet. You could buy, sell, trade and even breed them. Later on the Ethereum implementation proposal 721 (EIP-721) got introduced and confirmed as an Ethereum standard (ERC-721) in March 2018.

NFTs have the potential to improve many applications and enhance existing business models. **For the first time, users are actually able to hold distinguishable tokens that carry not only value, but also unique information in their blockchain wallet.**

Numerous companies from different verticals are looking into this new technology as a solution for what was previously not possible on the blockchain. According to OpenSea<sup>3</sup>, three new companies a day are starting to do an implementation with the NFTs. NFT use cases range from identities (KYC), collectibles, to education certificates and more.

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<sup>3</sup> Source: Keynote from OpenSea, 3/23/2018 at the event Explore 721 Dallas

**However, there are four major challenges we see that hinder the development and adoption of NFTs as well as enabling greater technological and business impact:**

- 1. Low speed of development:** due to the lack of a pluggable framework, the development of dapps can take months therefore severely increasing go-to-market time, which results in much slower adoption and increases competitive risks.
- 2. Lack of conventions and interoperability:** different verticals require different conventions which are currently missing to ensure interoperability. Equally important is the gap of interoperability between applications, which needs to be addressed in order to maximize adoption and business impact.
- 3. Missing registry of verified issuers:** a big missing part is a registry of issuers of NFTs, which would serve for authentication and validity of the issuers. Creating a common registry will reduce verification time as well as reduce business risks.
- 4. Limited open-source and blockchain-agnostic solutions:** current NFT applications are siloed for specific purposes and currently Ethereum-focused, but with opportunities emerging in other blockchains (EOS, NEO) too. The opportunity to have an open source and blockchain agnostic protocol will open far greater opportunities for dapps and usage of NFTs.

**Furthermore, there is a need for a unifying technological layer connecting these assets through a higher-level standardization model.** Building on top of the existing low-level technology would mean that each development team builds their own framework from scratch. The work gets repeated every time and each solution has to perform a separate audit. There are currently no processes and rules in place that would allow for a faster, secure and interoperable issuance and verification of these assets, consequently hindering the potential for wider adoption.

2018 is frequently called the year of NFTs and the timing for the Oxcert protocol is now. With the ERC-721 in place, we believe that there is a solid foundation for NFTs, resulting in an increased demand for a quickly deployable and effective development environment. We believe that the need for the Oxcert protocol will be driven on both the demand and supply side, notably for:

- a) End users, which will require at least parts of blockchain and NFT functionality
- b) Developers and service providers, which will require faster and more secure development tools to remain competitive in the market.

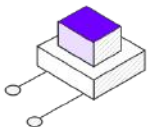
## 3. Solution

The Oxcert protocol utilizes the blockchain, a distributed ledger technology that was first built to support the Bitcoin cryptocurrency. Blockchain can be best described as a distributed ledger that maintains a list of records called blocks. Each block has a timestamp and is built on top of an already existing block, preventing any data from being altered retroactively.

Blockchain offers a unique way of solving the problem of secure online transactions and double spending. Due to its transparency and distribution of information to many decentralized blockchain nodes, it is nearly impossible to manipulate or duplicate existing data records, making it potentially suitable for recording events, records, identities, certificates, transactions and other documentation.

**Oxcert provides a framework with a set of on- and off-chain rules for managing xcerts - standardized and certified non-fungible tokens. Our mission is to equip application developers with a secure blockchain settlement, powerful tools, and community embraced conventions for managing the NFTs.**

Key characteristics of the Oxcert protocol can be outlined in four larger dimensions:



### 1. Pluggable settlement for faster development

The Oxcert protocol is a solid pluggable settlement which supports numerous business models. It clears away the low-level blockchain complexity thanks to its solid and flexible infrastructure that ensures interoperability between dapps by default.

**Using a plug-and-play framework shortens the development time from months to days.** Readily available APIs and SDKs in Python, Ruby, NodeJS and Javascript will allow traditional developers to start building blockchain applications right away.



## 2. Conventions for data interoperability and standardisation

The Oxcert protocol provides conventions for minting certified non-fungible tokens for unique assets. **With the use of the protocol, proof of an asset can be written into the token directly. These proofs are built following industry-specific conventions and enable data interoperability among various applications.**

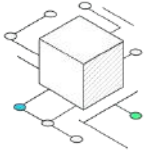
With the help of the community, we are structurally establishing a minimum standard that prevents data-siloing and poor user experience with future implementations.



## 3. Decentralized verification registry through curated registries

An important piece of the proposed protocol will be authenticating and assuring the validity of issuers building with the Oxcert protocol. Each NFT issued requires a deployed main (token) contract and a mechanism that will attest the validity and the issuers identity.

**We are proposing a token curated registry to pursue a decentralized approach in validating the issuers of NFTs.** Ultimately, a new issuer would stake a portion of tokens to get listed, while the existing holders will have the ability to approve or challenge the listing.



#### **4. Open source and blockchain agnostic**

Oxcert is an open-source and community driven project. Its first implementation is built on Ethereum. However, due to the blockchain-agnostic nature of the protocol, expansion to other blockchains will follow.

The protocol may also include a decentralized governance (DAO) mechanism to allow the community to vote for further improvements. Because the project is open-source, the community will also be able to rely on industry experts for specific conventions in particular verticals. This in turn may positively impact growth of new business models built on top of the protocol.

## 4. Oxcert Protocol

Oxcert is an open-source permissionless protocol for non-fungible tokens on the blockchain. These tokens are stored in cryptographic wallets and are owned by users. In addition to various common functions for transferring and managing standard non-fungible tokens, the Oxcert protocol provides an additional layer of conventions for creating non-fungible tokens from unique assets. These tokens are called Xcerts and are created through a custom minting process.

Xcerts represent standard non-fungible tokens, which also hold an imprint of an asset. With the Oxcert protocol, we can further validate proof of existence, authenticity and ownership of these assets without third-party involvement.

As opposed to Xcerts, which are non-fungible tokens, the Oxcert protocol also makes use of a fungible ERC-20 utility token, called ZXC. Xcerts are all unique tokens that carry certain information, whereas ZXC tokens are uniform and are used for various utilities described later in the document.

The first implementation of the Oxcert protocol is focusing on the Ethereum blockchain. The Oxcert protocol is designed to be blockchain agnostic, and supports building on other blockchains as well.

In this section, we will provide an overview of basic principles of Oxcert protocol with focus on non fungibles and decentralization. This is followed by a specification of the Oxcert protocol and framework. The section concludes with description of framework parts: Devkit, decentralized exchange and decentralized miner.

### 4.1 Overview

The advent of blockchain has redefined technology and set the course for the future of everything. But despite being an amazing technology, it is also very complex in nature. Writing and deploying smart contracts is difficult and can be a very perilous task. This fact prevents many people from adopting blockchain technology and building their decentralized applications on top of it.



Our mission is to equip application developers with a secure blockchain settlement, powerful tools and community embraced conventions for managing non-fungible tokens. Oxcert protocol extends the non-fungible paradigm with an opinionated certification and standardization layer for unique assets, which is based on the Oxcert conventions. This allows for creating certified non-fungible tokens on the blockchain, which also carry an imprint of a unique real-world asset.

The protocol supports a wide range of use cases where non-fungible assets and ownership play a role. Because the data are stored in decentralized blocks, the information can be fully trusted and verified by anyone and anywhere.

The Oxcert protocol is an open-source project so anyone can use the fully functional Oxcert protocol with no limitations. Developers have the ability to manually mint, burn, verify and transfer Xcerts. The protocol uses a publicly accessible network of digital wallets and smart contracts on the blockchain, making it extensible through third-party modules and a variety of dapps.

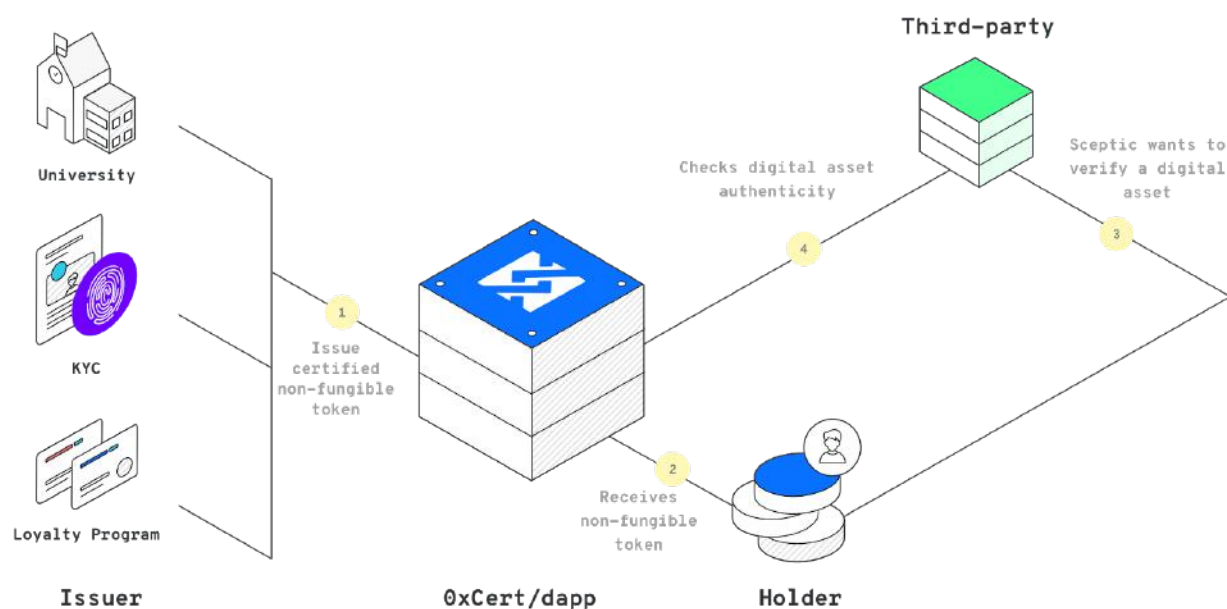


Figure 1 : Oxcert protocol can act as an intermediary between parties.

Oxcert is an opinionated framework and supports numerous business models used by third-party dapps. These applications sit on top of the protocol and can use the protocol tokens as a fuel for their service.

The dapps form a network of public and private services for unique assets and offer higher-level features that simplify and automate the process of creating and managing non-fungible tokens, provide public and private listings, rewarding mechanisms, integration gateways and more.

#### 4.1.1 Fungibility

The most common tokens of today's crypto economy follow Ethereum's ERC-20 specification. These tokens are so-called fungible tokens, because tokens of the same kind can be mutually interchangeable. If we make an analogy with fiat currency, a dollar bill can be exchanged for any other dollar bill, which does not create any difference for the holder.

Recently, another kind of token called non-fungible tokens started getting attention in the crypto community. Though we knew non-fungible tokens before, it actually all started with Crypto Kitties - tradable collectibles, which set the foundation for the now accepted ERC-721 standard. Unlike the ERC-20 identical tokens, the non-fungible tokens are unique and carry data.

The Oxcert protocol goes even further and introduces an Xcert as a standardized and certified non-fungible token based on ERC-721 and Oxcert conventions that carries information about a particular unique asset. This mechanism is unique to the Oxcert protocol and is described in later sections.

ERC-721 has given us an incredibly powerful standard on the Ethereum network - non-fungible tokens. The Oxcert protocol extends this standard and makes it opinionated. This will drastically shorten development times. For example, think about what Rails did for Ruby. Oxcert is dealing with the application layer where developers need to act fast and agile. In order to ensure interoperability among applications in the future, Xcerts follow specific conventions. This will prevent incompatibility on a higher level, which might happen if every NFT issuer deploys their own version of an industry standard. Having this level of standardization built on top of a strong ERC-721 standard prevents high level fragmentation and safeguards long-term sustainability.



Fungible tokens



Non-fungible tokens



Oxcert tokens

### 4.1.2 Decentralization

The protocol utilizes the blockchain, a distributed ledger technology that was first built to support the Bitcoin cryptocurrency. Blockchain is best described as a distributed ledger that maintains a list of records called blocks. Each block has a timestamp and is built on top of an already existing block, preventing any data from being altered retroactively.

Blockchain offers a unique solution to the problem of secure online transactions. Due to its transparency and distribution of information to many decentralized blockchain nodes, it is nearly impossible to manipulate existing data records, making it potentially suitable for recording events, records, identities, certificates, transactions and other documentation.

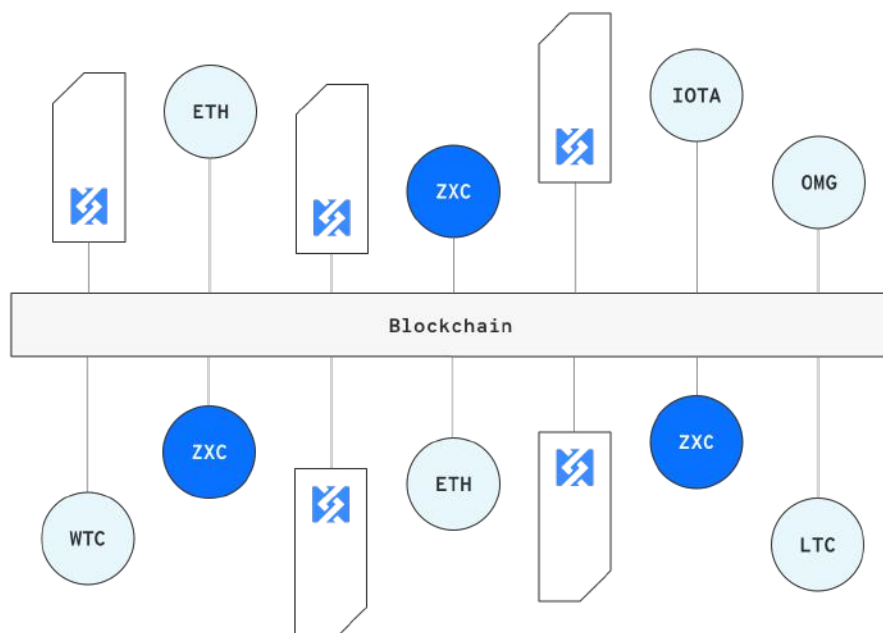


Figure2: Oxcert protocol uses blockchain to enable decentralization

By storing hashed data on the blockchain, individuals, companies and institutions can keep a decentralized record of their asset proofs, while maintaining sensitive data completely private. At the same time, all certified records, their issuers, and owners can be easily authenticated and referenced.

## 4.2 Specification

Oxcert provides a framework with a set of on-chain and off-chain rules for managing Xcerts and other non-fungible tokens. In addition, the Oxcert protocol is a pluggable settlement with an advanced integration layer for different dapps and relay applications.

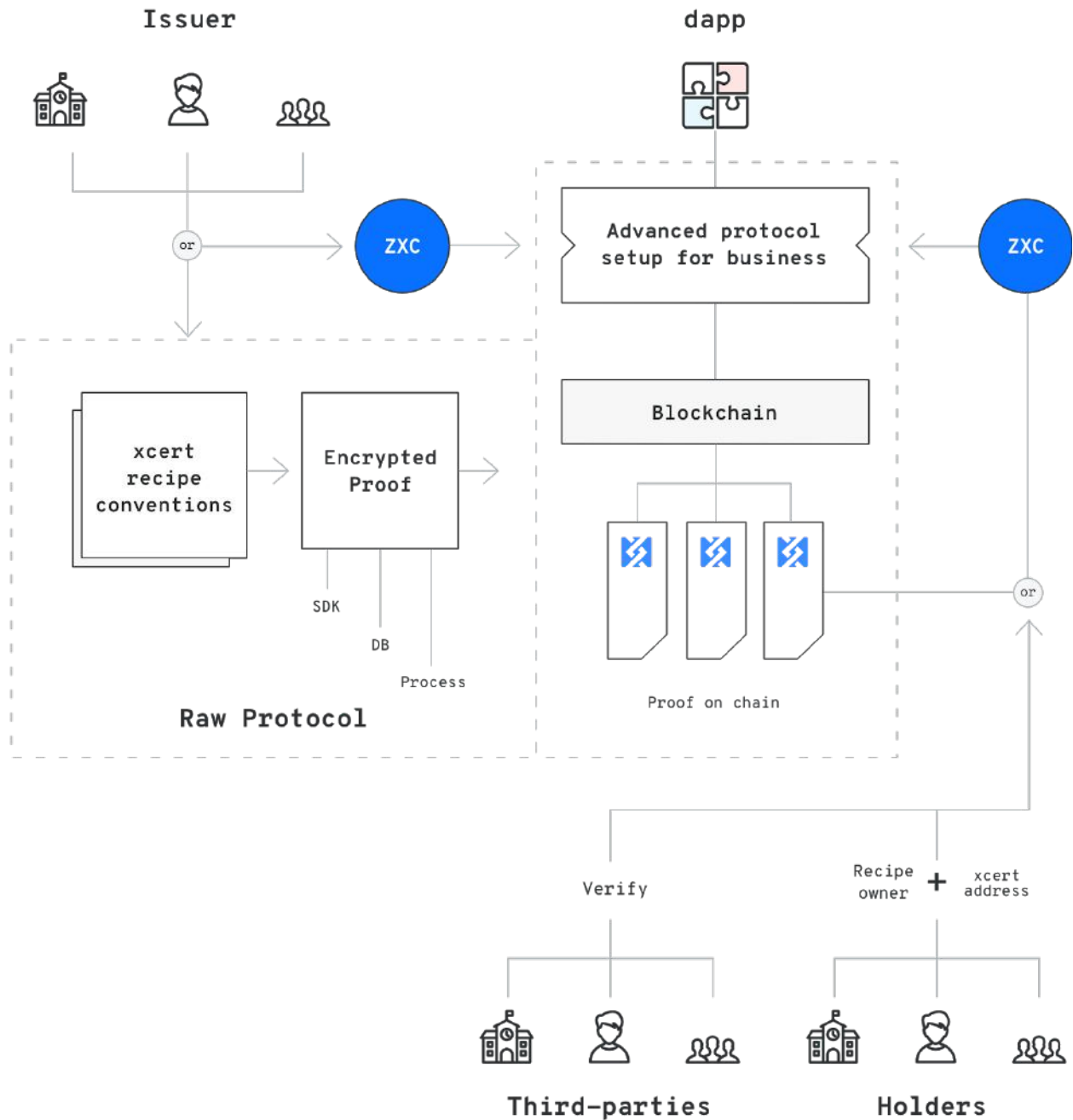


Figure 3: Users can interact with the protocol manually or through higher-level dapps.

### 4.3. Xcert

Digital assets on the blockchain as non-fungible tokens represent a new paradigm, which enables application developers to build advanced and secure applications for

managing real-world assets. Users hold asset ownership rights in their cryptographic wallets. They are able to exchange tokens between wallets and have control over the tokens they own.

The Oxcert protocol puts unique assets on the blockchain as non-fungible tokens. These tokens are called Xcerts and exist on the blockchain as an item of a specifically designed smart contract.

Xcerts are items of a specifically designed smart contract which implements the non-fungible functionality. An Xcert is identified by an ID, which is unique per Xcert smart contract and is always assigned to a cryptographic wallet. Besides the unique ID, a token can carry proof of a digital asset, arbitrary onchain data and a URI to additional off-chain data.

An Xcert smart contract is an extended non-fungible token smart contract. It follows the Ethereum's ERC-721 specification making it compliant with the non-fungible token standard. Furthermore, an Xcert smart contract holds assets of a particular Oxcert convention. This makes the contract opinionated and forces predictable data.

The process of converting unique asset data into a cryptographic proof is called "certification". Tokens that hold these cryptographic proofs are thus called certified tokens.

## 4.3 Framework

In general, software frameworks provide a standard way to build and deploy applications. The goal is to simplify the development process and allow programmers to avoid low-level details altogether by providing a working system - a framework. Better known frameworks include Rails (Ruby), Django (Python), Laravel (PHP) and Sails.js (Node.js).

The Oxcert framework consists of multiple parts, which enable application developers to build secure decentralized applications with the support for custom business models. The Oxcert protocol is an opinionated all-in-one framework. It is blockchain agnostic, provides conventions and includes powerful tools for building decentralized non-fungible applications.

In addition to the raw protocol logic, the Oxcert framework includes libraries and a set of smart contracts already installed on the blockchain. The Oxcert framework is a pluggable settlement with an advanced integration layer for different dapps and relay applications.

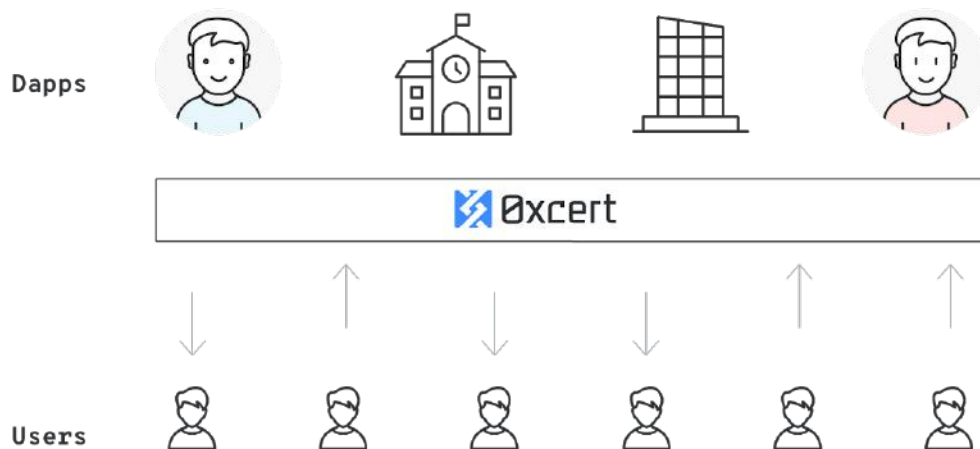


Figure 4: Dapps on top of the Oxcert protocol form a network of interoperable non-fungible services.

### 4.3.1 Devkit (SDK)

The framework tries to hide away the complex blockchain layer thereby wrapping the Oxcert protocol features into an easy to use SDK. This empowers developers with powerful decentralized tools that they can use as a standard API library.

The Oxcert protocol can therefore be easily integrated into existing systems. Applications don't have to struggle with the low-level blockchain complexity and can immediately start using a solid, secure and flexible non-fungible infrastructure that ensures interoperability between dapps by default.

### 4.3.2 Decentralized exchange

DEX is one of the key supporting components in the Oxcert framework. DEX represents a set of smart contracts installed on the blockchain which allow for a trustless

exchange of multiple different types of fungible and non-fungible tokens as single atomic operations.

DEX consists of multiple contracts. To make it upgradeable, the smart contracts communicate through proxy smart contracts. This way we can upgrade the core DEX contracts while the data is kept untouched.

A proxy is best explained as a smart contract that allows or rejects access to some key functionality and is controlled by a multisig wallet or a DAO. This way proxies can be trusted since they only allow access to smart contracts that were approved through the DAO process.

### 4.3.3 Decentralized minter

DXM is another important component of the Oxcert framework. It allows for the trustless minting of Xcert tokens directly to recipients.

The DXM can mint and exchange Xcert tokens for other fungible and non-fungible tokens in a single atomic operation. It also enables an issuer to delegate the mint execution and payment of blockchain fees to the recipient.

DXM consists of multiple contracts. To make it upgradeable, the smart contracts communicate through proxy smart contracts. This way we can upgrade the core DXM contracts while the data is kept untouched.

### 4.3.4 Continuous integration

A smart contract cannot be changed after it is deployed to the blockchain. Changes can be applied only by deploying a new contract at a new address.

The protocol may include a decentralized governance (DAO) mechanism to allow the community to vote for improvements and possibly fork the protocol into multiple versions. The contracts may use protocol tokens to securely drive a decentralized continuous integration of updates with no disruption, while also protecting all the parties and stakeholders.



## 5. Use cases

The Oxcert protocol is best described as the underlying technological base layer upon which new use cases can be built. Developers will no longer need to have advanced Solidity skills to create blockchain based solutions for unique assets. The simple to use libraries allow for fast and safe production, which in turn allow for more creativity and flexibility with subsequent solutions.

Below are some examples of use cases where the Oxcert protocol might prove to be useful. It is worth pointing out that this is not a final list of future implementations, but rather a quick overview of potential verticals that can benefit from the non-fungible technology.

### 5.1 KYC

As the “Know Your Customer” procedure becomes more and more important for ICOs, there is a growing demand for simple, cost-effective and secure solutions. Currently there are many KYC providers on the market, but none of them utilize the powerful of ERC-721 standard for non-fungible tokens.

With the help of the new standard, users can obtain a reusable KYC token, which can be stored and used for every subsequent KYC request. Users simply submit personal data to their KYC provider from which a secure hash is generated. This hashed information can then be sent in the form of an Xcert to their Ethereum wallet. By interacting with a dapp (e.g. through Metamask), ICOs will be able to whitelist wallets that have previously passed the KYC procedure and hold a valid KYC Xcert token.

## 5.2 Academic credentials

Although technology has helped to improve the education and academic sector immensely, it has not solved major pain points: certification fraud, interoperability and credentials verification remain unsolved questions that in turn delegitimize certification institutions, impair international mobility and incur huge costs for all parties involved. The authentication and verification process can benefit greatly from blockchain technology.

By storing records of achievements, accomplishments, certifications and education degrees on the blockchain, users can keep a decentralized record of their certificates from both academic institutions and professional certifying bodies that can be easily attested.

There are three major parties in the academic credentials space: issuers (universities, MOOCs, ...), holders (students that successfully finished a degree or course) and verifiers (parties that need to verify the authenticity of the academic credential, such as employers or LinkedIn).

With the help of the Oxcert protocol, issuers can seamlessly issue academic credentials to the holder's digital wallet. From each academic achievement, a hash string can be created and stored as an Xcert. The non-fungible token that carries the hash string is sent to the holder's wallet and stored as proof for future use. As opposed to previous solutions where the hash string was stored directly on the blockchain as a transaction, users now receive an actual unique digital asset.

Xcerts provide a much more flexible solution than a simple transaction on the blockchain. They can be reissued, have an expiry date and can be easily verified. Just imagine that an error was made when issuing an academic degree, which is then forever stored on the blockchain. Having the flexibility to reissue it allows for a small margin of error.

Certain continuing professional development (CPDs) also need to be renewed and often come with an expiry date. This would be extremely problematic without non-fungible tokens. Having that flexibility where an expiry date can be set to a certificate opens up a whole new space for new verticals and business models.

## 5.3 Art

Pieces of art are an important part of our cultural tradition; we could even say that it makes us human. Unfortunately, artwork is often the target of forgery, scams and fraud. Cases where entire collections were found to be forged are plentiful and have been a repetitive pattern throughout history.

The art industry is one of the largest unregulated markets, therefore investigating authenticity is strongly advised for buyers prior to a purchase. First, by performing extensive due diligence with the help of independent third parties. Second, with provenance investigation or history of ownership, the details about previous owners can be tracked in documents or other sources.<sup>4</sup>

For the first time in history, the art world has a chance to transfer ownership rights onto a medium, which cannot be altered and falsified. Provenance can easily be traced and viewed for the entire history of each work of art.

The process can be easily achieved with the Oxcert protocol. Data about an asset, e.g. Certificate of Authenticity (COA)<sup>5</sup>, is digitized using a specific convention, stored in cryptographic wallets and owned by their users. The detailed data itself can be accessed only by the owners. However, its existence, authenticity and ownership can, in turn, be examined and validated by the interested public without any third-party involvement.

This opens up a whole new space for artists. Not only provenance and forgery prevention, but also with blockchain technology a whole new concept is possible - fractional ownership.

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<sup>4</sup> <https://medium.com/Oxcert/millions-art-fakes-and-blockchain-7a7cb80a52a>

<sup>5</sup> <http://www.artbusiness.com/certaut.html>

## 5.4 Collectibles

From sports cards to Crypto Kitties, these are just a few forms of collectibles. When talking about collectible cards in the physical world, many different options come to mind: baseball cards, airplane cards, tradable collectible games (TCG), etc.

Whatever the case may be, serious collectors are interested in vintage cards. Among those, the highest values are attributed to rookie cards, inserts, sets and unopened sets. Other major factors collectors would consider when determining a card's value are its age, origin, condition, scarcity and of course, the featured player. The rarest cards usually come from limited editions and are among the oldest on the market. Values of these cards span from a few dollars to a few million dollars.

In order for a collector to get the most accurate price estimation, several sources of examination and grading are required. Major sports cards grading and autograph authentication authorities, such as Beckett<sup>6</sup>, PSA<sup>7</sup>, and Collectors Universe<sup>8</sup>, now rely their grading business mostly on online demand, while several guides for pricing are issued by Price Guide<sup>9</sup> and Krause Publications<sup>10</sup>, editing Tuff Stuff<sup>11</sup> magazine and Sports Collectors Digest<sup>12</sup>.

In addition, collectors also need to care of various aspects like the total amount of specific cards on the market, the number of collectors, amount of available ownership data, card provenance and of course the price.

Projects like Crypto Kitties are basically digitizing the very essence of the card collectors hobby, which is the joy of owning something unique and the thrill of comparing or even trading it with others. Even though card editions are issued in many hundreds of (equal) pieces, as soon as they land into the hands of a new owner,, their value cannot be measured as a static feature.

With help from the Oxcert protocol, we can now easily translate real world asset ownership to the blockchain. In the sports cards collecting field, the authenticity could

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<sup>6</sup> <https://www.beckett.com/>

<sup>7</sup> <https://www.psacard.com/>

<sup>8</sup> <https://www.collectorsuniverse.com/>

<sup>9</sup> <https://www.priceguide.cards/en>

<sup>10</sup> <http://www.collect.com/>

<sup>11</sup> <http://www.tuffstuff.com/>

<sup>12</sup> <http://www.sportscollectorsdigest.com/>

be traced to the card's manufacturer creating a digital imprint of each card issued. Therefore, when a buyer or collector finds a special insert in the set, they could trace its origin back to the issuer and verify it using the smart contract, without having to rely on third party authentication institution.

When interested in such an asset, collectors could check and verify every single transaction recorded in its data imprint, making it easier for them to evaluate the card before purchase. After acquiring it, they would be able to tokenize it on the blockchain and/or store it in their digital wallet, with ownership and management decisions solely in their hands, giving them the freedom to sell, transfer, burn, or just store it until a good opportunity for trading arises.<sup>13</sup>

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<sup>13</sup> <https://medium.com/0xcert/erc-721-hitting-a-home-run-77d6b4fca33d>

# 6. Ecosystem

The Oxcert team is determined to continuously bring value to the open-source community. Our mission is to empower developers with powerful tools and useful applications of non-fungible tokens.

In addition to the Oxcert protocol development, the purpose of the Oxcert team, as the core team behind the Oxcert protocol, is to provide a foundation for trustless, certified, non-fungible tokens on the blockchain and to manage and unify the community by connecting individuals and groups working in the area of non-fungibility and to provide resources and support for the related community driven incentives.

The Oxcert ecosystem is made up of various stakeholders, who all have different roles. Due to the nature of the project, a wide spectre of groups will be involved, ranging from research and development, all the way to for-profit companies. In a generalized sense, the Oxcert ecosystem is made up of four major components: Oxcert Labs, Oxcert Protocol Development, Oxcert Protocol Users and the Non-Fungible Alliance.

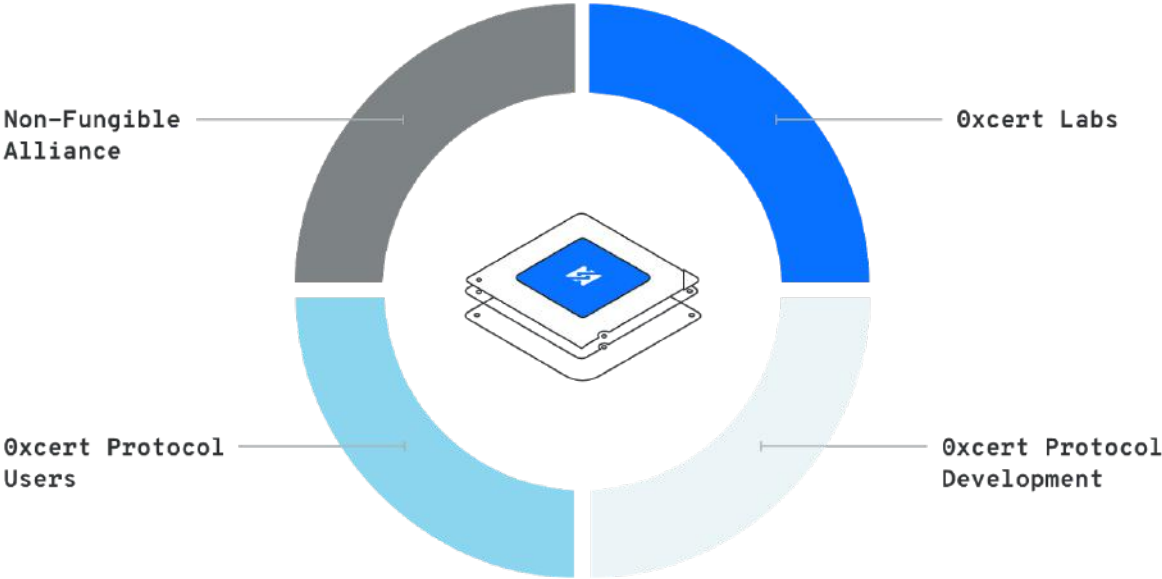


Figure 5: The Oxcert ecosystem

## 1. Oxcert Labs

We believe that we can only understand developers, the blockchain and decentralization, if the community uses the protocol and builds on top of it. We formed Oxcert Labs as the Oxcert discovery group, which will work on the latest innovations in the space of non-fungibility, decentralization and blockchain technology. Research and development are core pillars that will advance the frontiers of blockchain usability and ultimately drive adoption.

## 2. Oxcert Protocol Development

Since the Oxcert protocol is an open-source project, we strongly believe that its future development should be community-driven. Down the line, we might implement a full DAO for protocol governance, which would completely empower the developer community.

## 3. Oxcert Protocol Users

Adoption is key. A great amount of our time, energy and resources will be directed toward ensuring adoption of Oxcert technology. This idea is also completely in line with why we are not just developing a protocol, but rather a full framework with extended tools for fast adoption. The blockchain space in general has to be driven by wider adoption, which cannot happen if each new project has to develop all their smart contracts from scratch. New blockchain projects, as well as, traditional non-blockchain companies will be a key driving force in the future years.

## 4. Non-Fungible Alliance

As the space of unique digital assets begins to grow, it makes sense to have a collaboration space where all participants can come together. The NFT Alliance is a collaborative hub for building real-life applications with non-fungible tokens technology. It is an association of corporations, services providers and developers that closely collaborate on the implementations of the unique assets on the blockchain.

## 6.1 Participants

The Oxcert ecosystem consists of a large set of different parties that have come together in order to create and shape the non-fungible space.

Oxcert Ecosystem components	Oxcert Labs	Oxcert Protocol Development	Oxcert Protocol Users	Non-Fungible Alliance
Oxcert Ecosystem participants	Developer community Researchers Partnerships	Developer community Partnerships	Partnerships Developers Projects ICOs Companies	Existing NFT projects and companies

## 6.2 Promotion & Growth

Each of the four segments described above may have accompanying promotional and growth activities. These range from events and meetups to more comprehensive hackathons and implementation seminars. The Oxcert project is built with large scale adoption in mind, hence growth strategies are also planned.

## 6.3 Partnerships

The Oxcert protocol is a concept that brings together various actors from different segments and organizations. Establishing mutually beneficial partnerships will be one of the key progress drivers for the organization. Building strategic alliances with complementary organizations, companies and individuals can increase the value of the Oxcert protocol and widen its integrational scope even further.



Oxcert is building partnerships with stakeholders, which are relevant for its success both in the short-run as well as in the long-run. Some of the entities we have already established partnerships with are world leading advisory firms to enable us compliant operations as well as leading institutions promoting certification and the benefits it enables.

Currently we are cooperating with various blockchain organizations and startups, as well as currently in talks to make this cooperation public. Future partnerships will be announced on a rolling basis. We will strive to create meaningful and impactful relations with key players that can further improve the protocol or can assist in various verticals where key players specialize.

**PARTNERS**



**PROJECTS BUILDING ON Oxcert**



## 6.4 Ecosystem Growth Pool

As pointed out, the Oxcert ecosystem is a large structure of various parties and activities. We have dedicated a large amount of the token pool, as well as, funds raised to the growth and promotion of the whole ecosystem. In total, 12% of the entire token supply (Community pool) and 10% of funds raised (Ecosystem) will go towards growth of the Oxcert ecosystem.

## 7. Token economy

According to William Mougayar, author of "The business blockchain", a token is "a unit of value that an organization creates to self-govern its business model and empower its users to interact with its products while facilitating the distribution and sharing of rewards and benefits to all of its stakeholders." In this section, we present the Oxcert token purpose and characterization, token use cases and their implementation.

### 7.1 Token purpose and Use cases

The ZXC token is a protocol token and is introduced to align issuing parties with dapps and the community. With the infrastructure built around a system of smart contracts, its primary role is to provide the incentive mechanisms and to support the ecosystem with minimum possible fees.

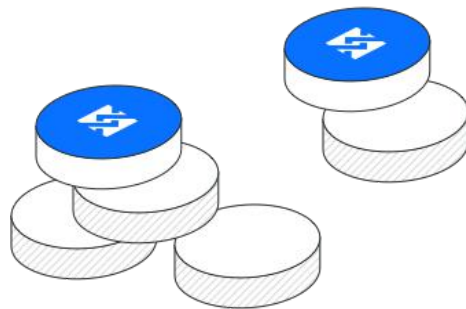


Figure 7: ZXC token is a native utility token of the Oxcert protocol.

The ZXC token is also a part of the extended Oxcert ecosystem that spans beyond the protocol itself. We envision its usage on a few layers, which further decentralize important elements of the corresponding ecosystem.

#### 7.1.1 ZXC within dapps

Dapps developed by Oxcert (e.g. KYC and Academia pilot projects), may use the ZXC token as the basic liquid asset for these dapps to operate on the protocol. Similar to gas on the Ethereum blockchain, the protocol token may play a role in all sorts of protocol and dapp activities. The following use cases are foreseen, but not limited to, within a wide variety of dapps:

- Medium of exchange (payment utility for fees and other costs within dapp ecosystems)

- Staking ZXC tokens within dapps that would require it
- Bidding ZXC tokens for accessing services and/or verification
- Granting access to certain features of the dapp
- Reward and loyalty mechanisms

## 7.1.2 Decentralized governance

Over time, a decentralized governance may be introduced to further strengthen the Oxcert community. As stated above, Oxcert aims to be a community driven project. Various stakeholders come together to co-create an ecosystem around the protocol itself in an effort to cast an even wider net. In this light, the decentralized governance model may be introduced in the future to drive protocol-level development updates, conventions and update integration.

### **Token purpose**

The protocol token may play a key role when creating a decentralized autonomous organization. The protocol token may not only be used as a rewarding mechanism, but also as a distributed voting mechanism.

## 7.1.3 Issuer Verification Registry (IVR)

It is becoming apparent that one of the major problems in the future may not be the technological barrier to issuing ownership rights of different unique assets on the blockchain, but rather the authenticity of issuing entities. The underlying objective is to create a self-sustaining curation ecosystem, which could exist without a centralized authority or even the creators themselves.

Currently, the authenticity of issuers is ensured through centralized authorities. For example, higher education institutions have to go through a quality assurance process, which is carried out by an external body to verify if certain standards are met. This is called higher education accreditation that can also be viewed as a curated list or registry of quality educational institutions.

The Oxcert ecosystem may introduce an Issuer Verification Registry (IVR), which would be a form of a token curated registry as proposed by Mike Goldin. This would represent a step toward further decentralization of the whole non-fungible assets space on the blockchain.

As pointed out above, one of the fundamental future problems in the blockchain space may become the authenticity of issuers. This is an issue that touches upon everyone involved in the ecosystem. End-users aspire to have only legitimate issuers and issuers want to be recognized as legitimate entities.

Due to the fact that the Oxcert protocol with its corresponding libraries is completely open source, there is a chance that these tools may be used by entities with ill intent. For example, if a well recognized education provider (e.g. Stanford) wants to issue academic credentials on the blockchain, they can do so using free available tools. Since this education provider maybe a well known and respected institution, there is no objection to them issuing tokenized academic credentials. An issue may arise if a diploma mill poses itself as the same well recognized education provider (e.g. Stanford). It could go ahead and start issuing tokenized academic credentials that may look the same as the originals. This is in fact a scenario that happens in real life and can be detrimental to the educational institution, it can cause a substantial and unnecessary economic cost. End-users and issuers are both affected by this matter. In order to prevent this from happening, a decentralized issuer verification registry maybe introduced.

### **Token purpose**

At the moment, there is no strong incentive that would award fairness and honesty in the blockchain space. A self-sustaining verification registry, which would use staking and rewarding mechanisms based on the Oxcert protocol token may answer many open questions in this relation. The Issuer Verification Registry (IVR) may use the ZXC token to give curation rights that correspond to the relative token weight of token holders. This is a floating ecosystem which has to be decoupled from price fluctuations of other cryptographic currencies or tokens. Only independent supply and demand of ZXC will create a feedback mechanism that ultimately encourages token holders to maintain and curate a list of authentic NFT issuers.

## **7.2 Implementation**

The ZXC tokens are the native utility tokens of the Oxcert protocol. These are fungible tokens and are compliant with the Ethereum's ERC-20 standard.

## 8. Structure

Oxcert project is and will be structuring its operations and delivery on its goals and roadmap via different elements, which include: corporation structure, governance, token rules, exchanges and voting rules.

### 8.1 Corporation Structure

Oxcert is currently and at the time of the token sale organized as a company, registered in Slovenia (European Union), the token generated and the funds collected will belong to this company. The Company is set up according to EU laws and regulations.

For the future development and roadmap, the following legal entities will enable the project to deliver on the planned roadmap:

- a) The Oxcert Protocol Foundation: - will manage the Oxcert as a protocol and will use a proportion of tokens for supporting the development of the protocol developers' and projects' community. Expected time to set up the foundation is in late Q3 2018 or Q4 2018.
- b) The Oxcert-for-profit (existing Company): will function as a service provider to the Oxcert foundation (initial development and handover of code) and will be funded by the funds generated by the token sale to develop the Oxcert protocol and initial two pilot cases (Academia and KYC). More information in the roadmap.
- c) For the purpose of better organisation and legal purposes, both entities (a) and (b) can set up additional entities within planned or new jurisdictions.

### 8.2 Governance

Both Oxcert Protocol Foundation and Oxcert-for-profit will be governed organizationally at three levels:

- a) Board of Directors: The purpose is the overall supervision of the project progress. Consisting of some of the current Oxcert advisors and Management team members, as well as potentially some new members. The number of members is limited to five (5). The Board of Directors will be set up within three

(3) months after the token sale or, in the case of foundation, at the time of setting up the foundation. Meetings will be scheduled on a quarterly basis.

- b) Advisory Board: Advisory for strategic related decision making. It will consist of some of current Oxcert advisors as well potentially some new members. The number of members is not limited per se. The advisory boards will be set up within three (3) months after the token sale or, in the case of foundation, at the time of setting up the foundation. Meetings will be scheduled on a quarterly basis.
- c) Management Board: Daily operations and, operational decisions and execution. Consisting of some of current management as well as potentially new members. The number of members is limited to five (5). The management board will be set up within 1 month after token sale. For the foundation, it will be set up at the time of setting up the foundation.

In addition, Oxcert will produce quarterly reports. Quarterly reports will be produced for each of the entities by the Management Board and confirmed by the Board of Directors. It will be publicly available on communications channels and webpage(s). The first report will be published in the first full quarter after the setting up the foundation or after the crowdsale.

We will actively invite interested stakeholders to contribute with their suggestions and comments on our progress and thus engage developers, users, as well as business partners. The suggestions are not going to be binding, however, they will be taken into consideration as valuable input from a wider ecosystem. The team will utilize existing and future communications channels (e.g. Telegram) to interact with the stakeholders as well as hold regular ask me anything (AMA) sessions, if needed, in addition to other interaction opportunities when deemed appropriate. The team is already and will also in the future be actively engaging in conferences and meetups with various stakeholders to exchange opinions and obtain feedback on work and progress.

## 8.3 Token

The Oxcert token ZXC and the protocol will be managed by the Oxcert Foundation. The number of tokens will be fixed and cannot be additionally minted. Any changes to the token design will be governed by the Oxcert Foundation and its Board of Directors. The token holders will not have voting rights, but the Management Board and Board of Directors can consult with a wider stakeholder ecosystem: developers, partners, token holders as well as other existing and future stakeholders.

## 8.4 Exchanges

Oxcert will strive to provide as many diverse opportunities for users to purchase or sell tokens. We will actively engage in partnerships with both centralized and decentralized exchanges. When looking for partner exchanges, we will apply the criteria of legal fit as well as acceptable commercial conditions.

The reach out to exchanges will be done prior to the token sale event, however, due to the nature of business practices of exchanges, any announcements can only be made after the token sale has finished. The Oxcert team can announce and talk about the exchanges only after the official confirmation of both sides (this is suggested by legal partners and exchanges).

We must understand the role exchanges play in the project and how the team views exchange partnerships. Exchanges are partners of the project in terms of that they enable users of the protocol to exchange the tokens in order to use and interact with the protocol.

## 8.5 Voting

Initially, token holders will not have any voting rights. The governance of both entities is in the hands of the Board of Directors and the Management Board for both Oxcert Foundation and Oxcert-for-profit.

In the future, the Oxcert Foundation can introduce voting rights for token holders in a sense of DAO. This decision and the rules are solely in the hands of the Board of Directors of the Oxcert Foundation.



## 9. The business side of things

Oxcert company is raising funds through token sales to fund the development of the Oxcert protocol and the establishment of the Oxcert Foundation, which will manage the ZXC token and the protocol. However, the Oxcert for profit company also needs a stable business model and a go-to-market strategy for long-term growth and development.

### 9.1 Business model

As Oxcert-for-profit will have an in-depth knowledge of Oxcert as a protocol, we will arrange our future revenue streams as follows:

- Advisory to startups and corporations: in implementing NFT in their business models and applying Oxcert protocol. Advisory may include, among other services: development, operational processes and legal support. In the event the knowledge or experience is not available in-house, then we will partner with others to provide it. Both advisory fees or equity are options as remuneration.
- Educational programs (training) and professional conferences: for both startups as well as corporations.
- Development of our own dapps: on top of Oxcert protocol and running these as separate business units under the (partial) ownership of Oxcert-for-profit.

### 9.2 Go-to-market strategy

For-profit advisory and educational programs will be based on acquiring and maintaining relationships with startups and corporates. We will have a dedicated sales unit, which will reach out to new and existing startup and corporate clients and help them address their challenges related to NFT implementations and solutions. Being the creators of Oxcert protocol, we will leverage our brand and our contacts to enable a steady sales funnel flow.

Based on our overall understanding of market opportunities and challenges, we may decide to enter a specific vertical in order to apply NFTs. We will make sure that we do

not enter into conflict of interest situations with our advisory and educational revenue streams. For each of the identified verticals, the for-profit can fund the initial set-up and solution development, however, the vertical dapp will be carved out as a separate business unit with its management, operations and development team.

### 9.3 Competitive landscape

The non-fungible token space is just beginning. ERC-721 has shown us that the immense capabilities of blockchain lie in front of us and have not really even been tapped into. Placing unique assets on the blockchain will spur a whole new plethora of ideas, projects and companies -- things previously impossible and unimaginable.

Oxcert is dealing primarily with the application layer of things: giving developers tools to more effectively build applications on top of this new standard. Developers can build dapps on top of it, while end users can use their solutions to prove authenticity, authorship or ownership of their assets (such as collectibles, university degrees, identity/KYC, in-game items or a house), making them secure and available while they are certified on the blockchain.

At the moment of writing this white paper, we were unable to identify a competitor that would be focusing on developing a unifying developer framework with conventions on top of ERC-721. However, there are competitors in various niches where the Oxcert protocol and higher-level dapps built with the Oxcert protocol can be used. These span from art, collectibles, education credentials, identity and more, all the way to real estate and car ownership.

Oxcert protocol is a building block for everyone to use. In that light, we see most of the companies that on first glance may appear as competitors, rather as potential partners and protocol adopters. Using unique digital assets is in many cases a superior solution, hence we will see a wider adoption in the future. Oxcert is merely going to provide the underlying infrastructure for all these projects to use.

The purpose of the Oxcert organization, as the core team behind the Oxcert protocol, is to provide a foundation for trustless, certified, non-fungible tokens on the blockchain and unify the community to the fullest. We intend to bring value to the open-source community engaged with the Oxcert protocol, to connect individuals and groups

working in the area of non-fungibility or certification and to provide resources and support for the related community-driven incentives.

## 10. Timeline

The inception of Oxcert was in 2017. After the first MVPs were created and tested, a more rigorous and detailed development roadmap was laid out. Although we are on track, there is still a long way to go. Below is a detailed roadmap, which is followed by milestones<sup>14</sup>.

### 10.1 Development roadmap

<b>Q3 2017</b> ✓	<ul style="list-style-type: none"><li>- First proposal of the blockchain certification technology</li><li>- First MVP for deployment and verification of certificates</li></ul>
<b>Q4 2017</b> ✓	<ul style="list-style-type: none"><li>- Shift towards open-source</li><li>- Explore wider adoption and a protocol approach</li><li>- Xcert smart contract draft</li><li>- Technical paper draft</li></ul>
<b>Q1 2018</b> ✓	<ul style="list-style-type: none"><li>- Pivot towards ERC-721 for assets on the blockchain</li><li>- Proof of protocol concept</li><li>- DEX draft implementation</li></ul>
<b>Q2 2018</b> ✓	<ul style="list-style-type: none"><li>- Joining forces with ERC-721 standard lead author, William Entriken</li><li>- ERC-721 complete implementation with bounty</li><li>- Xcert complete implementation with bounty</li><li>- DEX alpha implementation</li><li>- Xcert minter alpha implementation</li><li>- Oxcert scanner alpha dapp</li><li>- Technical paper 1.0</li></ul>
<b>Q3 2018</b>	<ul style="list-style-type: none"><li>- Whitelist/KYC certificate dapp (another PoC for crowdsale)</li><li>- Crowdsale PoC certificates used</li><li>- Protocol draft on Ethereum mainnet (limited)</li><li>- DEX alpha dapp</li></ul>
<b>Q4 2018</b>	<ul style="list-style-type: none"><li>- Protocol 1.0 (Ethereum) - Odin</li><li>- Framework 1.0 (protocol features, application layer)</li><li>- DEX 1.0 dapp</li><li>- Minter 1.0 dapp</li></ul>
<b>2019 Q1+Q2</b>	<ul style="list-style-type: none"><li>- Protocol 2.0 (Ethereum, second chain) - Aragorn</li><li>- Framework 2.0 (notification system, community requested features)</li></ul>
<b>2019 Q3+Q4</b>	<ul style="list-style-type: none"><li>- Pilot dapp for selected vertical 1</li><li>- Pilot dapp for selected vertical 2</li><li>- Curated registry</li></ul>

<sup>14</sup> The timeline and milestones may be susceptible to change due to unforeseen events, complications and interruptions.

## 10.2 Milestones

	MVP	Alpha	Beta	Odin (protocol v1)	Aragorn (protocol v2)
<b>Protocol</b>					
Xcert	X (proof of protocol concept)	x	x	x	
Conventions		x	x	x	x
<b>Framework</b>					
Devkit (SDK)		x	x	x	x
DEX implementation		x		x	x
DXM implementation	x	x		x	
<b>Oxcert Labs</b>					
ERC-721 implementation	x	x			
Scanner dapp	x	x	x		
Identity dapp			x		
DEX dapp				x	x
DXM dapp				x	x
IVR				x	x

## 11. Token distribution event

The Oxcert Token Distribution Event will take place during the months of June and July in 2018. In this section, we present the information about the Oxcert token, crowdsale, token distribution and funds allocation.

### 11.1 Token and crowdsale info

**Token name:** ZXC (ERC-20)

**Price of token:** 0.0001 ETH, 1 ETH = 10,000 ZXC

**Max presale bonus:** 20%

**Hardcap:** ~20,000 ETH (estimated based on bonus distribution)

**Softcap:** 5,000 ETH

**Token Supply:** 500,000,000 (fixed, no future minting)

**Circulating supply:** 250,000,000

**Percentage of tokens going to contributors in all token sale stages:** 50%, 250 mio ZXC tokens.

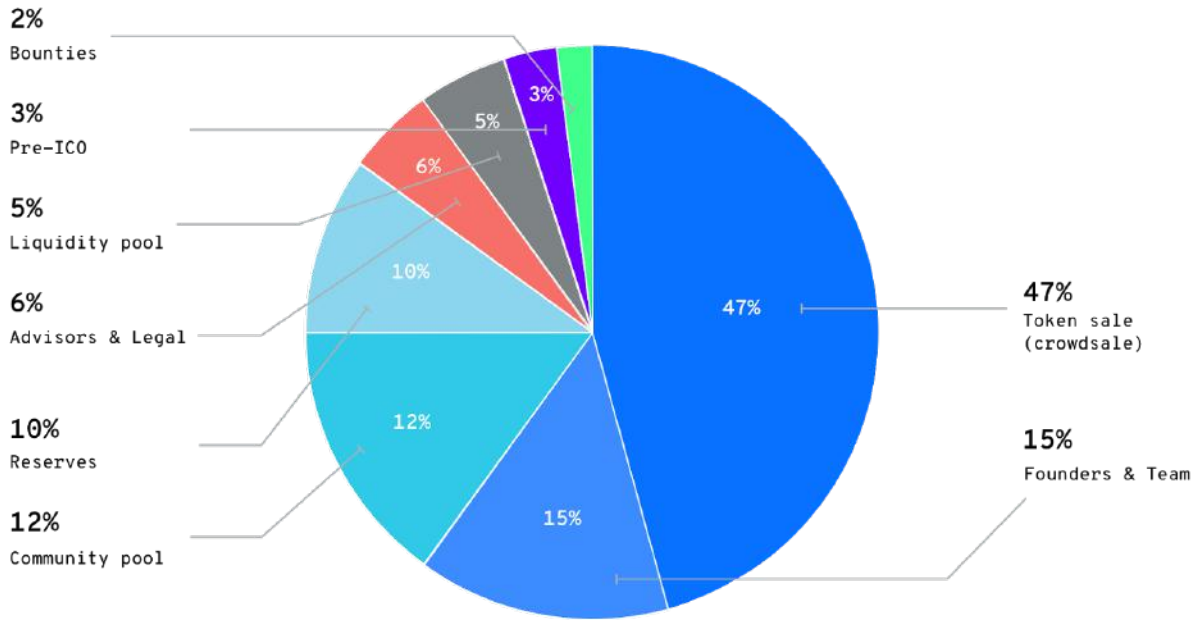
Oxcert token sale consists of four stages: Pre-ICO (early buyers), Private Presale (larger buyers), Public Presale (10% discount) and a Public Crowdsale. Details about each stage can be found in the table below. In case the allocated number of tokens for each stage is not sold in the allocated stage, it is rolled to the next stage. If there are tokens planned for sale left after the final stage, they will be burnt.

Stage	Date	Tokens Allocation	Max bonus	% Total tokens
Pre-ICO	Closed	15,000,000	40%	3%
Private Presale Min. participation 200 ETH	Until June 20th 2018	120,000,000	15-20%	24%
Public Presale Min. participation 1 ETH	July 2 - July 4, 2018	71,157,402	10%	14%
Crowdsale	July 4 - July 18, 2018	43,842,597	5% (first 24 hrs)	9%

## 11.2 Token distribution

The Oxcert token distribution is found in the table below. 50% of all tokens are reserved to be sold in different stages of the crowdsale. The remaining is reserved for team, current and future stakeholders and future reserves.

Token distribution	% total tokens	Purpose
Pre-ICO	3.00%	Token sale
Token sale (crowdsale)	47.00%	Token sale
Founders and team	15.00%	Incentives alignment
Advisors (& legal)	6.00%	Incentives alignment
Liquidity pool	5.00%	Supporting token liquidity
Community pool	12.00%	Supporting development of protocol community, allocated to Foundation
Bounties	2.00%	Bug bounties, allocated to Foundation
Reserves	10.00%	Future development fund



Distributed tokens differ in their lock-up period. The Founders, Team and Advisors have tokens locked-up in different periods. The buyers do not have tokens locked-up.

Lock-Up for Buyers: None

Lock-up for Founders: Locked for 6 months then 12.5% and 12.5% every three months.

Lock-up for Team: 20% released at ICO and 15% every three months after ICO.

Lock-up for Advisors: 20% at ICO, 40% in three months, 40% in six months

Lock-up for Reserves: 2 years

### 11.3 Distribution schedule

The distribution of the tokens will be done via the the crowdsale smart contract, with the following design:

- a) The Pre-ICO and Private Presale buyers will receive their purchased ZXC tokens to the ETH wallet address they have provided to Oxcert.



- b) The Public Presale and the Crowdsale buyers will receive their purchased ZXC tokens to the originating ETH wallet address from where the ETH funds to purchase ZXC token have been sent.
- c) All token buyers will receive their ZXC token the latest 7 days after the final date of the public crowdsale.
- d) The unsold tokens allocated to the token sale will be burnt within 7 days after the final end date of the public crowdsale.
- e) The remaining 50% of tokens (not allocated to token sale) will be distributed to their respective ETH wallet addresses within 7 days after the final end date of the public crowdsale.

All the distributed tokens will be locked up until 7 days after the final end date of the public crowdsale. Once the tokens are unlocked, the buyers can move them. This timeline is based on Ethereum network functioning normally and provided there are no lags.

## 11.4 Participation in the token sale

The participation in the token sale event will require buyers to:

- a) Have ETH (Ethereum) cryptocurrency
- b) Have an ETH wallet address
- c) Do a KYC required for the purchasing of the token
- d) Be a citizen of countries that are eligible for their citizens to participate in the token sale (more details in the Token Sale Terms and Conditions).

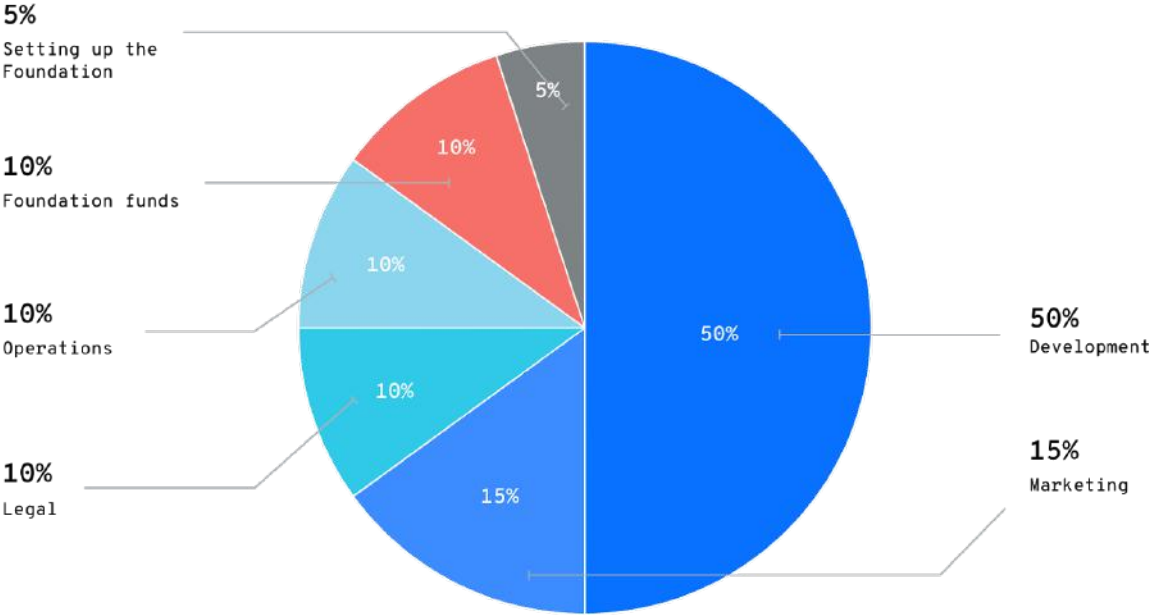
In addition to conditions above:

- e) In order to participate in the private presale there is a minimum of 200 ETH of purchase amount
- f) Only public presale whitelisted buyers can participate in the Public Presale. The public presale whitelist will be closed before the beginning of the public presale. The information when the whitelisting for public presale will be closed will be published on the Oxcert website. In the public presale 1 ETH is the minimum purchase amount
- g) During the public crowdsale the token sale will be open to all (respecting condition a) to d)). There will be no minimum purchase amount in the public crowdsale

# 11.5 Funds allocation

The funds collected in the token sale will be used with the following allocation:

Funds allocation	% of all funds
Development	50.00%
Marketing	15.00%
Legal	10.00%
Operations	10.00%
Setting up the Foundation	5.00%
Foundation funds	10.00%



The last two allocation areas are aimed at setting up the Oxcert foundation as a separate legal entity as well as transferring a part of funds to the Foundation to enable immediate foundation operations.

## 12. Team

The Oxcert team is a fully dedicated group of highly skilled individuals. At the moment, the team consists of 18 members that operate in all crucial areas to support both the long-term strategy as well as the short-term execution. In contrast to many other projects and companies, the vast majority of resources are in-house.

### 12.1 Team

#### **Operations**

Jure Zih, CEO

Mitja Pirc, COO

Anja Pukl, CFO

#### **Development team**

Kristijan Sedlak, CTO

Tadej Vengust, Solidity developer

David Ličen, Lead front-end developer

Luka Kacil, Senior blockchain developer

Leon Panjtar, Full-stack developer

Gregor Ažbe, Junior front-end developer

#### **Growth team**

Jure Jakomin, Growth hacker

Matic Užmah, Customer success

Petra Kosi, Social media

Petra Mišič, Public Relations

#### **Content and design team**

Nick Stein, Head of content

Lenka Tušar, Content creation

Romina Kavčič, Design Strategy

#### **Community management team**

Urban Osvald, Head of community

Tomaž Železnikar, Community manager

Kim Fairley, Community & Partnership manager

## 11.2 Advisors

**William Entriken, ERC-721 main author**

[www.linkedin.com/in/fulldecent/](http://www.linkedin.com/in/fulldecent/), <https://github.com/fulldecent>, <https://phor.net/>

William Entriken is the lead author of ERC-721. He is an active computer science researcher who has contributed tremendous amounts of open source projects to the community. In his non-blockchain life, Will is the General manager of Pacific Medical Training, a company that creates interactive medical training courses.

**Moe Levin, Blockchain pioneer**

[www.linkedin.com/in/moelevin/](http://www.linkedin.com/in/moelevin/)

Moe Levin is a blockchain evangelist and pioneer. He is the CEO of Keynote, a company focusing on creating blockchain events all over the world. Moe is also an Executive committee member of the Global Blockchain Council and the founder of the North American Bitcoin Conference.

**Mark Pui, MW Partners advisor**

<https://www.linkedin.com/in/mark-pui-b9ab3046/>

Mark Pui has up to recently been the Executive Director at PwC in Kuala Lumpur, Malaysia. He draws his skills and experience from a long and successful career in management consulting, corporate finance, consulting and advising. Mark is also a seed investor in early stage companies like 0x, Bancor, EOS, QTUM, Tezos and many others. Within the blockchain space, his focus lies in blockchain interoperability, tokenization of financial and non-financial assets, privacy protocols, stablecoins and Enterprise-oriented use cases.

**Dr. Draško Veselinović, multi CEO experience**

[www.linkedin.com/in/draskoveselinovic/](http://www.linkedin.com/in/draskoveselinovic/)

Assoc. Prof. Dr. Draško Veselinović is the President and CEO of SEBRA - Slovenian Business and Research Association. In his career, he held many top executive positions and has more notably co-founded the Yugoslavian Stock Exchange as well as the

Slovenian Stock Exchange. To this day, he remains a well respected authority in the field of business, finance and education.

**Dušica Lukač: Fintech expert, C-level**

**[www.linkedin.com/in/dusicalukac/](http://www.linkedin.com/in/dusicalukac/)**

Dušica is a seasoned financial expert and Founder of Stizzbuzz, a boutique investment and consultancy company with focus on Startups and Tech companies. She has also held numerous top level executive positions in and co-founded many successful business.

**Simon Belak, tech entrepreneur**

**[www.linkedin.com/in/simonbelak/](http://www.linkedin.com/in/simonbelak/)**

Simon is a tech entrepreneur, highly proficient in data analytics and currently working as a Mad scientist with Metabase. He is able to juxtapoz philosophical views and concepts with advanced science and technology - a unique perspective rarely found.

**Dr. Daithí Ó Murchú, President RCEEDAO Ireland**

**<https://www.linkedin.com/in/dr-daith%C3%AD-%C3%B3-murch%C3%BA-57228624/>**

Dr. Daithí Ó Murchú is the President of RCEEDAO Ireland and is under EU parliament and Commission Appointment. He is also the founding member at the International Fellow Academy of Ubiquitous Communication Educators International. He has vast experience from the education segment as well as in technology, innovation, business and management.

## Disclaimer

“This paper is for information purposes only and no part of it is intended to create legal relations between a recipient of this paper or to be legally binding or enforceable by such recipient against the company that owns the project. An updated version of this paper may be published on a date to be determined and announced by the company that owns the project in course. Company that owns the project makes no warranties or representations as to the successful development or implementation of such technologies and innovations, or achievement of any other activities noted in the paper, and disclaims any warranties implied by law or otherwise, to the extent permitted by law.”

### RISK FACTORS

THIS SECTION ON RISK FACTORS IS NOT AND DOES NOT PURPORT TO BE A COMPLETE ENUMERATION OR EXPLANATION OF THE RISKS INVOLVED WITH THE PURCHASE OF ZXC Token. THERE MAY BE ADDITIONAL MATERIAL RISKS THAT THE DIRECTORS DO NOT CURRENTLY CONSIDER TO BE MATERIAL OR OF WHICH THE DIRECTORS ARE NOT AWARE. THE FOLLOWING THEREFORE HIGHLIGHTS CERTAIN RISKS TO WHICH THE COMPANY IS SUBJECT TO AND WHICH THE COMPANY WISHES TO ENCOURAGE PURCHASER TO DISCUSS WITH THEIR OWN PROFESSIONAL ADVISORS.

Prospective ZXC Token purchasers should conduct such independent investigation and analysis regarding this Company, the ZXC Token and all other relevant market and economic factors as they deem appropriate to fully evaluate the merits and risk of their purchase.

The Company and its Directors disclaim any responsibility to advise purchasers of ZXC Token of the risk and considerations associated with the purchase of ZXC Token as they exist at the date hereof or from time to time hereinafter.

Each prospective purchaser of any ZXC Token must determine, based on his/her own independent review and such professional advice (including, without limitation, tax, accounting, credit, legal and regulatory advice) as it deems appropriate, that the purchase of ZXC Token is appropriate and suitable for it, notwithstanding the clear and substantial risks inherent with the purchase of ZXC Token.

You should consult with your own legal, regulatory, tax, business, investment, financial and accounting professional advisors to the extent that you deem it necessary, and make your own decisions including decisions regarding the suitability of this purchase based upon your own judgement and upon advice from such professional advisors as you deem necessary and not upon any view expressed by any party mentioned in this Whitepaper.

The purchaser of a ZXC Token should be capable of evaluating the merits and risks of such a purchase and should have sufficient resources to be able to bear any losses (which may be equal to the whole

purchased amount) that may result from such a purchase. Prospective purchasers of ZXC Token should be aware that the value of ZXC Token may go down as well as up and that they may not be able realise their purchase amount on the secondary market (if there is any).

#### Forward looking statements

Certain statements in this Whitepaper constitute “forward looking statements” that are used on the beliefs of the Directors and reflect their current expectations. When used in this Whitepaper or in any of the Company’s material, the words “estimate”, “project”, “believe”, “anticipate”, “intend”, “expect”, “plan”, “predict”, “may”, “might”, “could”, “should”, “would”, “will”, the negative of these words or such other variations thereon or comparable terminology are intended to identify forward-looking statements. Such statements reflect the views of the Directors at the time the statements are made with respect to future events based on information available at that time, and are subject to risks and uncertainties that could cause actual results to differ materially from those contemplated in those forward-looking statements. The Directors assume no obligation to update or revise these statements to reflect current information, events, or circumstances, including changes in any risks or uncertainties that may impact them.

#### Management Risk

If any of the directors or officers of the Company cease to participate in the operation of the Company, the operations, objectives, and activities of the Company may be adversely affected.

#### Liquidity of ZXC Token

As of the date of this Whitepaper, there is no active secondary market for the ZXC Token. Whilst the Directors hope that the success of the Company will lead to a secondary market developing, there is no guarantee or assurance that a public market will ever develop. There is often no assurance that a purchaser of the ZXC Token will be able to sell or dispose of the ZXC Token.

#### Changes in Applicable Law and Regulation

The Directors believe that it is possible that emergency intervention by certain Governments may take place in the future in respect of ICOs. Such intervention may be implemented on an “emergency” basis, subjecting market participants without notice to a set of regulations which in some cases may be unclear in scope and in application.

Should any relevant laws or regulations change, the legal requirements to which the Company and the ZXC Token may be subject could differ materially from current requirements. No assurance can be given that future legislation, administrative rulings or court decisions will not adversely affect the Company and the ZXC Token.

The Company may be subject to a number of unusual risks, including contradictory legislation, incomplete, unclear and changing laws, ignorance or breaches of regulations on the part of other market participants, lack of established or effective avenues for legal redress, lack of standard practices and confidentiality customs characteristic of developed markets and lack of enforcement of existing regulations.



## Early Stage Companies

The Company is a start-up and has no operating history against which purchasers of the ZXC Token may consider the appropriateness of purchasing the ZXC Token.

Many risks and uncertainties affect start-up and early stage companies, which often have very limited operating history, profits or cash flow. There can be no assurance of the success of such enterprises. Their potential must be considered in light of the problems, expenses, difficulties, complications and delays frequently encountered in connection with new or developing businesses, including technology risks, unproven business models, untested plans, uncertain market acceptance, competition and lack of revenues and financing.

The technological fields and markets that many start-up and early stage companies address have undergone and are expected to continue to undergo rapid and significant change. Rapid technological developments may result in the technology of companies becoming obsolete, uneconomical or uncompetitive before any commercial success or financial return can be achieved. Numerous other risks may affect developing companies and ventures, including risks that products or services will be found to be ineffective, unreliable, unsafe or uncompetitive and risks that such companies' technologies, products or service will not achieve market acceptance or penetration. Market acceptance of new products, services or technologies depends on many factors and uncertainties and cannot be assured.

Start-up and early stage companies may compete with entities that have established businesses, relationships and positions in the market and that have much more substantial financial, business, technological, marketing and distribution assets, operations and resources. There can be no assurance that any developing company will be able to compete successfully with more established companies.

These companies may be overly dependent on the vision, skill and leadership of a single or limited number of executives. In a start-up business, the loss or disability of a key person(s) can result in significant financial hardship, in some cases the failure of the company. More than other businesses, start-ups are highly dependent on the skills and contributions of very few key employees.

Any projections, forecasts, plans or other forward-looking statements are subject to numerous risks, uncertainties, changing circumstances and other factors that could cause actual results, performance, plans, prospects, operations and opportunities to differ materially from any forward-looking statements, including competition, inability to identify and do business with appropriate customers, existing and future law and regulations, liabilities under the securities laws, inability to hire, retain or qualify sufficient management and staff, general economic conditions, rapid technological change, cost overruns, delays in bringing products or services to market, marketing failures, difficulty in penetrating markets, delays or failures in developing anticipated capabilities, products or services, failure to obtain necessary regulatory approvals, insufficient funding, lack of availability of capital, rates of economic growth, levels of consumer and business spending, conditions in the technology and financial industries, dependence on strategic partners and business relationships, unproven business models, adverse developments affecting customers and end-users, fluctuations in securities markets and valuations, limited marketing, expansion risks, losses and costs, uncertain revenues and profitability, conditions in particular industries, accounting problems, costs, delays and liabilities arising from legal proceedings, failure to obtain and maintain intellectual property or proprietary rights and management failures.

## Banking and custody arrangements

The Company's cash will be held by a bank. The Company acknowledges that any such deposits are not guaranteed by the bank and are exposed to losses incurred in the event of the insolvency or failure of the bank. The Company will take credit risk against any party which is holding its cash. The Company will therefore rank as a general unsecured creditor in the event of the insolvency or failure of the bank with which deposits or instruments have been placed.

## Regulatory Supervision

The Company and the ZXC Token are not regulated by the EU or Slovenian Financial Services Commission or any other regulatory or supervisory authority. The EU or Slovenian Financial Services Commission does not vouch for the financial soundness of the Company, the ZXC Token or for the correctness of any statements made, or opinions expressed with regards to it.

## Cybersecurity

Cybersecurity threats are present within the realms of cryptocurrencies. There is a risk of loss of funds, including a total loss, should an unauthorised intrusion or theft occur.

Whilst the Company has considered its cybersecurity, risks related to software weakness, human error, external attacks and others, continue to exist and pose a material risk to the Company and the value of the ZXC Token.

Advances in cryptography, or technical advances such as the development of quantum computers, may present risks for crypto-currencies, which could result in the theft or loss of ZXC.

Hackers or other malicious or criminal groups or organizations may attempt to interfere with the Token Sale, the ecosystem or the availability of ZXC in several ways including, but not limited to, denial of service attacks, Sybil attacks, mystification, phishing, attacks, smurfing, malware attacks, or consensus based attacks.

## Ethereum Network

The ZXC Token is a part of the Ethereum network. If problems related to the Ethereum network normal functionality arise, this may affect the ZXC Token functionality and may adversely affect the Company and the value of the ZXC Token. Therefore, any malfunction, unplanned function or unexpected operation of the Ethereum protocol may cause the ZXC ecosystem or ZXC to malfunction or operate in a way that is not expected. Ether, the native Ethereum Protocol account unit may itself lose value in a similar way to ZXC, and also in other ways. For more information on the Ethereum protocol, see <http://www.ethereum.org>. Any error in the smart contract may lead to the lose.

As with other decentralized cryptographic tokens and crypto-currencies, the Ethereum blockchain used for the ecosystem is vulnerable to mining attacks, including but not limited to, dual-expense attacks, powerful mining attacks, selfish mining attacks, and critical competition attacks. Any successful attack

poses a risk to the software and the expected performance and sequencing of Ethereum contract calculations. Despite the best efforts of the team, the risk of known or new mining attacks exists.

Crypto-currencies and cryptographic tokens are a cutting-edge, untested technology. In addition to the risks stipulated above, there are other risks that the Oxcert team cannot predict. Risks may also occur as unanticipated combinations or as changes in the risks stipulated herein.

**THE FOREGOING RISK FACTORS DO NOT PURPORT TO BE A COMPLETE EXPLANATION OF THE RISKS INVOLVED WITH THE COMPANY AND THE ZXC Token.**