WHITEPAPER

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Contents

Disclaimer

This whitepaper relates to the intended development and use of the Orbital network. It is for information purposes only and may be subject to change.

The Orbital network as envisaged in this whitepaper is under development and is being constantly updated, including but not limited to key governance and technical features. The EPIC token (the Orbital governance and network currency) involves and relates to the development and use of experimental platforms (software) and technologies that may not come to fruition or achieve the objectives specified in this whitepaper.

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No advice

This whitepaper does not constitute advice to purchase any EPIC tokens. It must not be relied upon in connection with any contract or purchasing decision.

Risk warning

The purchase of EPIC tokens and participation in the Orbital network carry with it significant risks.

Prior to purchasing EPIC tokens, you should carefully assess and take into account the risks.

No third party affiliation or endorsements

References in this whitepaper to specific companies and platforms are for illustrative purposes only. The use of any company and/or platform names and trademarks does not imply any affiliation with, or endorsement by, any of those parties.

Obtain professional advice

You must consult a lawyer, accountant and/or tax professional, as well as any other professional advisors, as necessary prior to determining whether to purchase EPIC tokens or otherwise participate in the Orbital network.

Introduction

Decentralized internet protocols (public blockchains), pioneered by Bitcoin and Ethereum, can be used to radically improve socio-economic infrastructure. However, despite being in production for over ten years, they still lack mainstream adoption.

This is because there are no frameworks that provide a readily accessible platform to build applications that serve a useful purpose in the real world. Instead, Blockchain v.1 has focused on building native applications that are digital first like Bitcoin itself, DeFi[1] the Metaverse which, although multi-billion dollar industries in themselves, will never be familiar enough to be adopted by the ordinary person.

Central authority has existed in the socio-economic infrastructure to protect consumers from each other and from private businesses. However, over time, these central authorities (governments, regulators, central banks) have abused their positions of power, resulting in a greater need to protect consumers from them rather than from each other.

Public blockchains achieve this but with significant compromise in terms of efficiency, performance and privacy.

Private blockchains have few limitations of scope and scale but do not provide full protection for the users against the potentially malicious activity of the blockchain owner.

[1] https://www.coinbase.com/learn/crypto-basics/what-is-defi

What is Orbital?

Overview

Orbital is a network of blockchain networks, solving the problems of real-world utility, performance and security by combining the best features of public and private protocols.

Orbital has the following uniquely powerful attributes:

1. Efficiency - it records transactions on the distributed ledger quickly and cheaply;
2. Transparency - it produces an immutable, public record of transactions;
3. Privacy - transaction details are only known to the contracting parties.

It is further intended that both developers and non-developers alike can easily create blockchain-based applications without needing to know any blockchain-specific programming language or even processes.

Orbital achieves this with a framework facilitating the creation of a network of networks. Each network comes with pluggable, packaged code (modules), a choice of consensus protocol (Proof-of-Authority or Proof-of-Stake) and a REST API library allowing easy integration with popular client user interfaces, making it the fastest and easiest framework upon which to build applications that serve useful purposes in the real world.

The result is a generation of hyper-local communities, self-organising with blockchain operating systems, not because they necessarily distrust each other but simply because it is the most efficient means to do so.

The system makes it trivial to tokenize everything for tamper-proof records of title, contracts and exchanges of value, rendering state-sponsored governance obsolete.

Infrastructure and Protocol

The Orbital network is built on the open-source Tendermint protocol[2], "building the most powerful tools for distributed networks", providing Proof-of-Stake (public) or Proof-of-

[2] https://tendermint.com/

Authority (private) consensus options, together with LevelDB[3] for the ledger and Go[4] for the smart contracts.

By adopting this protocol, Orbital can facilitate the creation of application-specific blockchains (ASBCs). Users can join different ASBCs, subject to the permission of the ASBC administrator.

Orbital acts as the "Core" chain, through which the ASBCs connect to each other, thereby creating a pseudo-public network comprised of a network of private or permissioned networks. Orbital provides this facility by adopting the IBC Protocol[5] which is becoming the standard for interchain activity.

Orbital also provides a distributed exchange function (DEX) using the open-source 0x protocol.[6] This allows all the utility coins of the ASBCs to be efficiently exchanged by the broader network users through the order book and smart order routing.

Transaction Fees

Orbital is a public Proof-of-Stake multi-asset distributed ledger, whose native staking token is called the EPIC.

Transaction fees are calculated as a function of ledger read/writes (rho) on an ASBC and the prevailing charge for each unit of rho in EPICs. Fees are also charged for cross-chain activity routed through the Orbital Core.

Consensus Protocols

Proof-of-Authority blockchains rely on reputation of the ASBC owner. Once an ASBC owner earns a reputation for being dishonest, the information will quickly spread and users will cease to patronise the network any more.

Proof-of-Stake blockchains rely on the risk that the network operators have in their stake of network currency which represents the entire value of the network. Dishonest activity causes the network currency to decrease in value, hurting those with the largest stakes. Therefore, the incentive for honest behaviour is greatest for those who hold the largest stakes so the network relies upon them to ensure that the network state is always valid.

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[3] https://en.wikipedia.org/wiki/LevelDB
[4] https://go.dev/
[5] https://tendermint.com/ibc/
[6] https://www.0x.org/

The Orbital Modules (API Library)

The Orbital modules, accessible via the REST library is the unique value proposition from Orbital. It is logically organised into five sections and contains over 50 endpoints.

1. Identity

   Identity, or rather pseudo-identity is the cornerstone of any blockchain network. Accounts exist as a cryptographic keypair – public address and private key for signing/authenticating.

   Accounts can create, own and transact Tokens and Assets. Tokens can also be owned and transferred programmatically by Assets.

   Orbital uses the Elliptic Curve Digital Signature Algorithm (ECDSA) which is common to Bitcoin and Ethereum so users can bring their own addresses to the ledger and they will be compatible.

   ECDSA is only a signature algorithm. It cannot be used for encryption. Transactions and other messages that required signing are first hashed using keccak256 and then signed according to standard RFC 6979.

2. Tokens

   Tokens are the fungible tokens (e.g. that represent money, loyalty points or stock units) of the Orbital network. Any user can create a token and describe it with unlimited metadata.

   Orbital tokens are feature rich. In addition to simple functionality like Creating and Updating tokens, there are modules that determine which users can hold tokens (Blacklisting and Whitelisting), and a comprehensive library for charging Fees, including for issuance, transfer and redemption. In addition, there are also functions to retrieve token Balances and Transaction Histories from the ledger.

   Tokens have a debit variable which allows the issuer to Debit from user accounts when this variable is set to true in order to accommodate conventional merchant functionality like direct debits.

   Any user can use the Credit function that automatically credits another account subject to transaction, daily and monthly limits. This might be useful for corporates to allow employees to spend on their account, for example.

Finally, there is a rich variety of token trade functions that can be used to exchange one token for another between two users, facilitating an escrow function as well.

3. Assets

Assets are the non-fungible tokens (NFTs) of the Orbital network. NFTs can represent absolutely anything in the real or natively digital world. Even things that are identical in all respects except for a single, unique identifier (like a car VIN for example) are "tokenised" on the Orbital network using the Asset library.

Orbital assets are, however, considerably more functional and versatile than NFTs on other platforms. When Creating assets, users can define attributes in immutable metadata and mutable metadata to accommodate updates. However, all updates, in fact all events, are recorded in the asset for audit purposes and can be retrieved by calling the Asset History.

The metadata is split into two sections – *public* and *private*. Private metadata is encrypted before being written to the ledger so that only the owner can read it. The owner can also share the private metadata with other users by encrypting a clone with the public key of another user.

The owner can also specify which users can edit the assets separately from just being able to view them. Naturally, the user who modified an asset is identified in the asset log.

Another important feature of Orbital assets is the distinction between ownership and possession which are functionally independent. This accommodates various logistics scenarios that typically go in conjunction with transfers of ownership in that transfer of possession can be handled separately.

Like tokens, Orbital assets can be the subject of a Claim and they can also be digitally signed by any party invited by the owner. This opens up the entire world of digital contracting and Ricardian contracts as the contract metadata can be included in the asset Description and downloaded as a PDF, making the asset enforceable by computer code as well as recognised in the courts of law.

Finally, Orbital assets are hierarchal. Assets can be top level "Parents" or they can be "Children". The family tree is limitless and unlike real families, children can have unlimited parents. When these relationships are

established, users can also specify whether ownership and/or possession of the children is transferred with the parent. Continuing with the car analogy this might facilitate something like the service record of the car moving with the transfer of ownership but the insurance record staying with the previous owner, for example.

4. Escrow

In addition to basic transfer and bi-party exchange of tokens and assets, the Orbital library has a sophisticated, multi-party, multi-token, multi-asset trade function. Including the option to specify possession or ownership transfer as part of the conditions, essentially makes this an unlimited escrow function that accommodate a multitude of use cases regardless of complexity and counterparties.

Parts of this Escrow function can be pre-packaged as Collections by independent parties and added to the overall contract.

5. Utilities

There are a host of utility or "helper" functions including a simple peer-to-peer messaging function and the facility to Upload images, videos, and other media.

There is a Tag function that allows the user to add keypair metadata to any transaction for downstream indexing, grouping or searching.

There is a Claim function that locks up tokens that can be claimed by any user that has the "secret". This function can be used for various incentive programs like location-targeted loyalty and airdrops, or for access control for example.

Finally, there are offline tools that facilitate cryptographic signing that allow users to authorise transactions from their accounts even when they are not connected online to the ledger.

The DAO Maker

In addition to the Orbital Modules, another important unique feature of Orbital is the DAO Maker[7]. The DAO Maker is a suite of modules specifically engineered for the easy and secure creation and management of a DAO, including governance, staking, distribution, voting, and crisis management.

[7] https://ethereum.org/en/dao/

Fiat Gateway

Given the continued complexity and growing regulatory oversight of bank and card crypto fiat gateways, it is envisaged that Orbital stakeholders will establish a network for getting in and out of EPIC using cash (or alternative tokens of value in the real world). There will be a special module for managing this process to locate the nearest "teller" and to provide a trust framework.

Applications

There is no limitation on the type of application that can be built on Orbital. It has been conceived to accommodate the digitalisation of every existing conventional process of recording contractual obligation, title, and transaction.

In a sense, it can be regarded more as an alternative to conventional backend application technologies like Firebase than other blockchain network technologies that are more focused on natively digital projects like DeFi.

As part of the product offering, there is a versatile progressive web application (PWA) with components that map to the blockchain modules. This consistent, modular approach makes the whole framework intuitive to use and very quick to build useful applications.

Tokenomics

There will be a fixed supply of 1 billion EPICs. The free float is undetermined as it is not possible to estimate how many will be staked to participate in the governance of the platform compared to the market demand to pay for transaction fees.

However, since fees are distributed to validators (and their delegators) in direct proportion to their stake, an equilibrium will be established at the point that the return on stake meets the aggregate risk-adjusted return demand from stakeholders.

In addition, the more demand there is for Orbital ASBCs, the greater demand there will be for EPICs which should establish a market price as the present value of future expectations of network utility.

This is the same model as the Cosmos network that currently has a market capitalisation in the region of $7 billion.

The Orbital DAO ("Club EPIC!")

Orbital is a distributed autonomous organisation[8] (DAO), "trading as" Club EPIC!. It is a private members' club, where the member decides how much membership fee they want to pay. The more a member pays, the more voting power they have to decide the activities of the club, i.e. what specific projects to fund.

If the club needs to contract with the outside world, it is envisaged that this will be done via a Purpose Trust[9].

As well as charging for Core services, the club also collects fees for the use of the compiled modules on the ASBCs. The fees are distributed to the validators in relative proportion to their stakes. New modules are admitted to the core according to voting by all stakeholders.

The network currency, EPIC, is a fixed-supply cryptocurrency issued on the Ethereum network (ERC-20). It acts as the membership register and also a place where new members can join the club when the initial supply of memberships has sold out.

EPICs are the only staking token of the Orbital DAO. EPICs are a license for the holder to vote, validate, or delegate to other validators. Like Ethereum's Ether, EPICs are also used to pay for transaction fees and are rewarded to validators and delegators who delegate to them.

Anyone can be a validator. However, there will be a maximum limit of twelve validators, consisting of those who apply to be a validator with the twelve highest stakes. The limited number of validators ensures high network performance and delegation removes limitation on participation in the validation process.

Comparables

Ethereum	https://ethereum.org/en/	Market cap = $320B
Cosmos	https://cosmos.network/	Market cap = $7.3B
Neo	https://neo.org/	Market cap = $1.0B
Horizen	https://www.horizen.io/	Market cap = $0.5B
Aragon	https://aragon.org/	Market cap = $80MM
XINFIN	https://xinfin.org/	Market cap = $0.5B

[8] https://ethereum.org/en/dao/
[9] https://www.careyolsen.com/briefings/non-charitable-purpose-trusts-jersey

Secret	https://scrt.network/	Market cap = 300MM
Bancor	https://home.bancor.network/	Market cap = 320MM