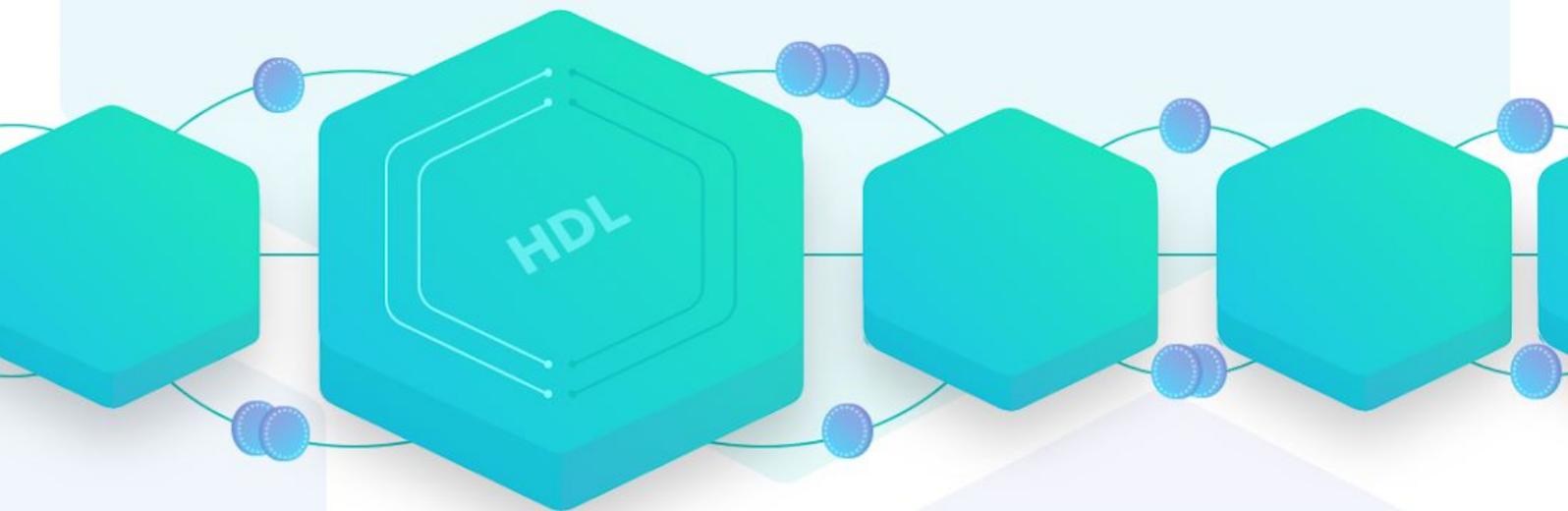




HOLDVEST PROTOCOL

The Liquidity Aggregator Protocol



WHITEPAPER

May 2018
Version 0.1

HOLDVEST PROTOCOL

The Liquidity Aggregator Protocol
Your universal gateway to the crypto markets

Build and manage your blockchain portfolio with secure access to every exchange from a single portal

HOLDVEST is a new kind of blockchain investment platform that combines the best features of exchanges, brokerages and instant trading apps. The platform is built around a liquidity aggregator connected to all major crypto exchanges, as well as its own internal decentralised exchange, enabling users to gain the best price for their trades from a single portal. Along with powerful tools for portfolio management, HOLDVEST therefore offers exceptional security, convenience and flexibility, and is suitable for experienced traders, institutional investors and newcomers alike.

The HOLDVEST platform is monetised by means of the HDL token, which is hosted on the Waves blockchain. Tokens equivalent to 50% of all ongoing HOLDVEST revenues will be burned to decrease supply and deliver value to holders.

The HOLDVEST Protocol will be an open source repository for dApps, making all of the platform's functionality available to developers and businesses, enabling anyone to build powerful financial tools.

beta.holdvest.com

Crowdsale: holdvest.com

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Overview

HOLDVEST is an all-in-one platform that provides a powerful but user-friendly gateway to the cryptocurrency markets, enabling anyone to access blockchain investment opportunities with a minimum of difficulty and without requiring extensive experience of specialist crypto exchanges.

Key to the value offered by HOLDVEST is its built-in liquidity aggregator, which automatically connects the user with many different exchanges in order to obtain the best spot price for any supported cryptocurrency. At the same time its clean, straightforward user interface is suitable for novice investors and experienced traders alike. HOLDVEST therefore combines the simplicity of a brokerage with the low fees and high liquidity enabled by accessing multiple exchanges, all within a single portal.

Unlike many other crowdfunded blockchain projects, HOLDVEST already has working software and a functional website. Additional funding is sought via an ICO on the Waves platform in order to extend this and bring further value to both tokenholders and the wider cryptocurrency community.

Users will interact with the platform via the HOLDVEST token (HDL), which will be hosted on the Waves blockchain and will be used to pay for trading fees and services such as Premium features (e.g. margin trading) and advertising. Customers will be able to use HDL to secure discounts on these. Where other currencies are paid, these will immediately be converted to HDL using the platform's internal aggregator engine. 50% of all HDL received in this way, whether directly or indirectly, will be burned to ensure constant demand.

Key features

1. Buy and sell supported cryptocurrencies at the best price from one account.

Users do not need separate accounts for several different cryptocurrency exchanges, or to be familiar with the quirks and nuances of each one. HOLDVEST enables them to buy and sell popular cryptocurrencies for the best price and for the lowest fees.

2. Unique internal liquidity aggregator. This is achieved by HOLDVEST's custom-designed matching engine, which connects to dozens of different exchanges in real time, using their combined orderbooks to buy and sell cryptocurrencies at the most advantageous prices for customers. The concept is similar in principle to the process employed by instant exchange services such as ShapeShift and Changelly. However, in the case of HOLDVEST the engine is built into a traditional exchange interface and the list of supported currencies is much larger. Additionally, the savings brought about by this approach are passed on to the customer, making it both extremely convenient and much cheaper to use. Moreover, the engine is constantly being updated and improved, and there are already a number of planned optimisations that will make it suitable for use by high-frequency traders.

- 3. ICO investment.** As well as buying and selling popular and promising cryptocurrencies, HOLDVEST's users will also be able to invest in new blockchain projects and participate in token sales for new initiatives, directly from the platform. New token listings, ICO ratings and token distribution will take place via the user's account. HOLDVEST will be conducting its own ICO on the platform to prove its stability and trustworthiness.
- 4. Easy access to crypto index funds.** In the same way that index funds and exchange-traded funds (ETFs) provide investors with exposure to a diversified and risk-balanced portfolio of assets in the traditional financial sector, HOLDVEST will give users the opportunity to distribute their funds across multiple different cryptocurrencies and tokens using a series of crypto index funds. As well as including a number of our own flagship indices (e.g. Top 10 coins by market cap; Top 5 Ethereum assets, etc), we will enable traders to put together their own index portfolios. These will be rated by their success, allowing the development of an open market of custom crypto indices with flexible fees, backed by real transactions on top exchanges.
- 5. All-in-one portfolio management.** HOLDVEST's aim is to provide a unified portal for blockchain and cryptocurrency investment that enables users to acquire, hold and trade all of the products they want to within a single, powerful application. As new currencies and opportunities arise in the blockchain space, these will quickly become available on the platform. HOLDVEST is committed to staying up-to-date with the latest developments, integrating new exchanges and allowing its users to access these new opportunities as soon as possible.
- 6. Simple and expert UI options.** HOLDVEST features a clean, intuitive interface that provides a low-friction user experience suitable for new and advanced users alike. Accessing different cryptocurrency markets can be achieved in one click. More experienced users will appreciate interactive charts, online analytics and mobile apps for on-the-go portfolio management.
- 7. Cold/external wallet withdrawals.** Cold storage and user-controlled wallets vastly reduce the risks of hacking, theft and downtime inherent in centralised crypto exchanges. HOLDVEST will allow users to transfer cryptocurrencies or ICO tokens directly to an external wallet immediately after they have been purchased, meaning that no funds need to be held on the platform.
- 8. A commitment to decentralisation.** With the rise of user-friendly decentralised exchanges (DEXs), HOLDVEST will be connected to more and more of these peer-to-peer cryptocurrency marketplaces. Users will increasingly be able to enjoy near-instant execution of their orders with zero risk. Moreover, as a greater number of users come to our platform, we will be able to match their orders effectively against each other on a peer-to-peer basis using our own internal DEX, further decreasing reliance on third-party exchanges.

Background: the case for HOLDVEST

Having spent many years both using and developing cryptocurrency services, the HOLDVEST team identifies a number of reasons why their platform is necessary and meets significant market demand. Moreover, the fast-changing dynamics of the blockchain sector have given rise to a series of new issues and barriers to adoption in recent months. HOLDVEST's platform solves these, attracting a segment of the existing and incoming userbase in the process.

Exchanges disabling new registrations

With the unprecedented growth and interest in cryptocurrencies over the course of 2017, even the largest exchanges have been swamped by new users. Several have had to take the step of closing to new registrations or going offline to upgrade their infrastructure.

This has been for both technical and regulatory reasons. In December Bittrex was forced to disable new registrations for several weeks, and in January 2018 Binance also took the step of halting registrations to allow for an upgrade. These and other popular exchanges have had to deal with technical issues such as slow transactions, delayed withdrawals and other server issues due to the weight of traffic.

Even where exchange infrastructure can deal with the load placed on them by additional users, they still have to fulfil their KYC obligations. This places significant administrative pressure on them and several have taken many weeks to clear the backlog. Coinbase dealt with hundreds of thousands of new registrations per week last year, adding 100,000 new accounts in just 24 hours at one point in November 2017. Evidently, at a time of enormous interest, existing exchanges are not always able to scale to serve their markets.

As an aggregator, HOLDVEST only needs to register and verify its accounts on each exchange once, meaning that all of its own users do not have to conduct KYC across many different exchanges themselves. When HOLDVEST integrates fiat payments (currently scheduled for later this year), users will need to undergo KYC processes to make fiat deposits and withdrawals. Once again, though, they will need to do this only once and not for every exchange connected to HOLDVEST's liquidity engine. Additionally, HOLDVEST has dedicated servers and other measures in place to ensure it can deal with a sudden influx of traffic associated with a fast-growing userbase.

High fees

Almost all credible centralised exchanges have relatively high trading fees, typically in the range of 0.25-0.5% for moderate users. Despite batching transactions, they also charge fees for deposits and withdrawals that are far in excess of network transaction fees. HOLDVEST's liquidity aggregator takes into account not only price and orderbook depth but also trading and withdrawal fees.

As volumes increase and the platform is able to access more advantageous fee tiers on its partner exchanges, this will further benefit users. Savings can be passed on to its customers, with the result that even comparable fee levels on HOLDVEST will be more cost-effective than on other exchanges.

Accurate price discovery is difficult

Because altcoin orderbooks can be thin and fragmented across many different exchanges, it can be very difficult even to establish the best price. Accessing that opportunity effectively at that moment then requires having an open balance on all of the relevant exchanges – something that is simply impractical for ordinary investors and traders. However, this is exactly what HOLDVEST's liquidity aggregator was designed to do, splitting orders and purchasing coins from many different exchanges in the most efficient way possible.

Storing coins can be difficult

Exchanges are generally accepted to be unsuitable for long-term cryptocurrency storage due to the risks of hacking and theft, as well as scheduled or unscheduled downtime making funds inaccessible. HOLDVEST will support instant withdrawals, meaning coins are immediately transferred to the user's external wallet and are not held on the platform itself.

Limited price-tracking tools

Regular exchanges do not make it easy to calculate long-term profits, which can also have implications for tax liabilities. In the US, the rules around trading income and capital gains are complex, meaning that many traders have to spend significant time completing their accounts, or are forced to wait for a certain period of time before they can sell their crypto investments. HOLDVEST's trade- and price-tracking tools allow users to gain an overview of profit and loss quickly and easily.

Direct ICO investment is banned

Many exchanges prohibit withdrawals of cryptocurrencies directly to ICO deposit accounts, and will not credit tokens paid for in this way. This is generally because ICOs require instructions to be attached to the deposit transaction, or because the token is not supported on the exchange at the time the ICO is conducted. Tokens paid for by withdrawals from exchanges are generally lost to the buyer.

By carrying out custom integrations for each token sale, HOLDVEST can ensure that every token in demand by its customers is supported, providing a service offered by few if any other exchanges or trading platforms.

HOLDVEST platform and functionality

HOLDVEST's platform and technology addresses these widespread issues, lowering the barrier to cryptocurrency adoption and providing a valuable service for existing traders and investors.

Rather than existing only in demo or MVP form, HOLDVEST's platform is in working beta and can already be used to buy and sell several major cryptocurrencies. The service can be accessed at <https://holdvest.com>. A significant amount of money and developer hours have already been invested in the platform, and the team is strongly motivated to complete and enhance it further.

Proof of the platform's reliability and stability will be established when HOLDVEST conducts its own ICO using the service. It will be possible to deposit BTC, ETH, BCH, LTC, DASH and WAVES to the platform and use them to buy HDL tokens. ICOs typically see periods of intense activity, so this will be an opportunity to demonstrate the platform's capacity to deal with high levels of traffic. The ICO will also provide the first major tranche of users, many of whom we hope will continue to use HOLDVEST to store and trade HDL tokens as well as other cryptocurrencies.

The funds collected during the ICO will be used to complete the initial functionality planned for HOLDVEST, and then to build out further features according to the roadmap (see Roadmap section). Core functionality is described below.

Cryptocurrency investing

Acquiring and trading cryptocurrencies is difficult and daunting for new users and even those who have spent some time familiarising themselves with the necessary websites, platforms and technologies involved. There are administrative barriers including registration and KYC processes; security concerns such as choosing and storing appropriate passwords, implementing 2FA, and setting up secure cryptocurrency wallets; and great deal of complexity and confusion around different exchanges showing varying prices and having diverse fee structures.

Simply put the market as a whole, as well as the infrastructure that serves it, is inefficient. This reflects the fact that cryptocurrency is still at an early stage in its history. However, those inefficiencies bring an opportunity for platforms like HOLDVEST that can offer new users something qualitatively better than the alternatives.

Deposits and withdrawals

HOLDVEST users can deposit major cryptocurrencies into their accounts, including BTC, ETH, BCH, LTC, DASH and WAVES, with many further currencies to be added after the ICO ends.

All trades placed on HOLDVEST are passed through to exchanges and executed as real trades in the marketplace, so all balances are fully backed at all times and funds can be withdrawn to users' external wallets whenever they want. (At the present time users can request BTC withdrawals including all profits earned on the platform; if funds are invested in other currencies, they will need converting to BTC first. Implementing withdrawals for other currency balances is one of the first priorities for the platform post-ICO.)

Provided that KYC and other regulatory procedures can be met, it will also be possible to deposit fiat currencies such as USD and EUR, and to withdraw funds using VISA/MasterCard, giving easy access to fiat-crypto trading.

Buying and selling crypto

The cryptocurrency scene has expanded enormously over the last five years. From representing around 95% of the total market in 2013, bitcoin's market share has decreased to around 35%.¹ There are good reasons to expect it to decrease further, since every new cryptocurrency project launched increases overall market size without increasing bitcoin's total value.

Moreover, many new ICO and altcoin projects have a growth profile that makes them attractive investments for early adopters, since they may increase in value ahead of – or, as importantly, out of phase with – bitcoin itself.

There are now more than 1,500 distinct cryptocurrencies and crypto tokens, several hundred of which enjoy substantial daily trading volumes. The sheer number of opportunities, as well as the different communities that support these initiatives and the diversity of exchanges on which they trade, can make it overwhelming for those seeking to buy, sell and store them.

HOLDVEST's unique matching engine analyses dozens of cryptocurrency exchanges and organises the best price for trades executed via the platform. This means finding the lowest prices for buyers – splitting orders and spreading purchases across several exchanges if needs be, in order to access the full liquidity of the whole crypto market – and conversely, ensuring the highest prices for sellers. Moreover, trading fees are factored into the prices and so there are no unexpected charges: just a single, straightforward and attractive price for each trade.

Additionally, there is no need for users to create dozens of different crypto wallets or register on multiple exchanges. All that is required is a single account on HOLDVEST.com, and it is possible to buy or sell any cryptocurrency with one click. Accounts are protected by two-factor authentication (already implemented) and the liquidity aggregator's operation across many different exchanges means that risk is not only borne by HOLDVEST but very widely diversified.

Adding new exchanges to HOLDVEST's liquidity aggregator engine is straightforward, since it has been designed with multiple connection formats and APIs in mind. As new exchanges are launched and prove secure and reliable, they will be connected to the order engine with absolutely minimal delays.

Furthermore, ongoing development and constant optimisation of the aggregator engine will ensure the necessary speed and performance to support the demands of high-frequency trading (HFT). This will enable algorithmic traders and other tradebots to hook into our

¹ See <https://coinmarketcap.com/charts/#dominance-percentage>

exchange in the same way that they do with regular cryptocurrency exchanges, with the difference that they will be able to execute trades at the most advantageous price across a wide range of markets, all at once and from a single endpoint. Special fee structures will be applied for high-volume and high-frequency traders, making HOLDVEST highly competitive compared to other exchanges.

As an aggregator of crypto exchanges and prices, HOLDVEST has the following advantages:

- Increasing liquidity and market depth by combining orderbooks from multiple exchanges
- Acquiring the best possible price at any time from a potentially unlimited number of marketplaces
- Accessing the best fee tariffs on each exchange due to HOLDVEST's status as a large trader that brings significant volumes from its broad userbase
- Single, unified fee for trades; no separate deposit/withdrawal fees
- Easy online management with one account via different channels (web, mobile)
- Simple, clear accounting and trades tracking
- Comprehensive and sophisticated analytics when required

ICOs

If the primary application for blockchain technology has been peer-to-peer online cash and value transfer, its second major use case has been crowdfunding. Token sales or initial coin offerings (ICOs) have proven an extremely popular way of raising money for a new business or initiative. Recent regulatory interest has largely clarified the compliance frameworks within which such ventures need to operate, and as a result we expect interest only to increase in the coming years. Both the number and average size of ICOs are likely to grow, with fully compliant token sales attracting enormous sums of money from investors.

With this in mind, HOLDVEST will both support participation in major token sales of interest to its community, and provide users with the secure and user-friendly infrastructure to hold their own ICOs – serving both sides of the emerging ICO phenomenon.

ICO investment

Just as HOLDVEST connects users with many different cryptocurrency exchanges to allow orders from the full depth of the market from a single interface, so will it enable them to invest in a broad range of third party ICOs from the same portal.

This functionality makes HOLDVEST the only tool required for a very broad range of investments in blockchain projects and cryptocurrencies. Users can search for upcoming

ICOs and receive notifications about key dates and events, such as start and end dates, bonus tiers, referrals and other marketing campaigns.

ICO tokens that have been purchased on HOLDVEST will of course be tradeable on the platform's internal exchange. This addresses a major problem currently faced by many ICO projects and their investors: the lack of a secondary market in the early days after a token sale ends. HOLDVEST will provide a guaranteed marketplace for all of the ICOs it makes available to its users, and in certain cases may be able to give assistance to ICO teams to help them secure listing with some of their exchange partners. This will be particularly valuable for Ethereum tokens, since there is no built-in DEX (as with Waves), and third-party decentralised exchanges such as EtherDelta tend to be difficult for regular users to access, with implications for liquidity.

Finally, HOLDVEST users will be able to give feedback for different ICOs, voting using the HDL tokens they hold. This will provide a kind of decentralised rating mechanism that will help others to conduct due diligence on different projects.

Launch your own ICO

As well as enabling users to access popular ICOs directly from their accounts, HOLDVEST will make it straightforward for anyone to launch their own ICO projects.

The ICO Founder includes the option to create and issue tokens on both Waves and Ethereum, two of the most popular blockchains for ICO initiatives.

- Waves features straightforward and low-cost token creation, fast transactions and an automatic market on the built-in decentralised exchange.
- Ethereum features Turing-complete smart contracts and is the market leader for smart contract applications. As the second-largest crypto by market cap, Ethereum has a very large community of developers and supporters.

The ICO Founder tool will make the process of token creation and distribution on either network painless, entirely removing the technical overheads associated with holding an ICO. All that will be required to start an ICO on HOLDVEST will be to register on the platform, create the ICO campaign by filling in a form with the required parameters (token supply, funding targets/caps, etc), and to pay the commission fee in HDL tokens. Different ICO structures will be supported, including various price models, duration of campaigns, bonuses and discounts, and other parameters.

HOLDVEST's own ICO will be held on the platform, proving the stability and reliability of the software.

Additional services

In addition to cryptocurrency trading and ICO investment/launches, HOLDVEST has a series of features that will bring further value to its users and to the wider cryptocurrency ecosystem.

Portfolio management

HOLDVEST provides easy-to-use tools to track cryptocurrency investments via web portal and mobile app, including giving analytics for trades, comparing different portfolio management strategies and informing future trading and investment decisions. Key features include:

- **Cryptocurrency analytics.** HOLDVEST provides detailed information for each cryptocurrency or token, including interactive charts, trading history and indicators and analytics to help traders gauge the potential of each investment and market movements. News feeds from major cryptocurrency sources and channels such as bitcointalk, Twitter and Reddit will be provided.
- **Trading recommendations.** Tips and analyses from well-known traders and professional agencies will be posted, with emails or push notifications informing users about key developments or favourable market conditions. Sources can be customised and more trusted sources prioritised for each user.
- **Portfolio overview.** HOLDVEST's interface features an at-a-glance overview of users' portfolios, listing individual crypto holdings and profits as well as total portfolio value.
- **Trading history.** All trades conducted on the platform are available to search and can be displayed graphically on interactive charts. This helps users to analyse their histories by visually representing buys/sell, profit/loss, and overall success rates.

Crypto Index Funds

HOLDVEST aims to empower new and existing cryptocurrency users by making cryptocurrency investing and trading easier and more convenient. One of the ways we intend to do this is by allowing people to access a series of cryptocurrency indices, similar in principle to the index funds used extensively in the mainstream financial world (S&P 500, FTSE 100, DAX, NASDAQ, etc).

Indices are highly convenient for users who wish to buy or sell more than 10 coins, and multiple indices will be available. As well as pre-defined examples, users will be able to create their own index funds from a list of available cryptocurrencies, weighting the percentage of each one as they see fit.

Example: BIG5 Crypto Index

Bitcoin (BTC): 35%

Ethereum (ETH): 25%

Ripple (XRP): 15%

Bitcoin Cash (BCH): 15%

Litecoin (LTC): 10%

It will be possible to compare the performance of each index against the others, and set up instructions to distribute available balances among them as desired.

Some traders will be particularly successful with their custom index funds, and others may want to emulate them as a result. HOLDVEST provides not only a means for users to profit from these successes, but for the creators of these indices to gain revenues from their work. There will be an open market for these custom crypto index funds, with flexible fee models that allow their designers to receive additional income as they share and promote them within the community. A ratings system will make it clear what the relative advantages and disadvantages of each one are, and it will be possible to compare different index funds according to multiple criteria, such as profitability on different timescales, longevity, liquidity and so on. The community can also vote on them by means of the HDL token.

Benefits of HOLDVEST's crypto index funds

- Diversification of investments by distributing funds across multiple cryptocurrencies/indexes according to preferred investment profile and risk appetite
- Ability to invest in a wide variety of crypto index funds with just one click
- Open markets of custom crypto index funds with flexible fee models
- Transparent index fund transactions: all funds are backed by real holdings and trades on exchanges
- Index rating lists that are easily searchable by criteria, including profitability, longevity, sector, capitalisation, etc.
- Convenient online investment at any time using multiple investment strategies.

Arbitrage

Due to the nature of its core technology and its operations as a liquidity aggregator, HOLDVEST is in a unique position to take advantage of the inefficiencies in the crypto markets.

Since the platform searches for the best price across many different exchanges, it is often the case that the minimum ask price on one exchange will be higher than the maximum bid price on another. It is therefore possible to buy coins on the first exchange and simultaneously sell them on the second, profiting from the difference. Executing such trades is known as arbitrage, and is common in mainstream financial markets. Whilst it is practised

on the crypto markets – particularly the deeper and more liquid/active bitcoin markets – there are limits to the degree to which it is practical for many altcoins, due to the requirements of holding funds on all relevant exchanges and monitoring all markets constantly in order to be able to take split-second advantage of opportunities as soon as they arise.

HOLDVEST will make such trades available on its platform for Premium users, based on their HDL token holdings. Premium users will receive signals about arbitrage opportunities, which will be sent automatically across different channels (email, browser notifications, push notifications for mobile). HOLDVEST will execute the trades for them if they indicate their interest, allowing them to generate guaranteed profits with practically zero risk. The fees for this service will be paid in HDL tokens.

Decentralisation

Decentralisation is fundamental to blockchain and cryptocurrencies. Removing the costs, risks and abuses inherent in centralised currencies and systems is the reason bitcoin was created. However, whilst the core bitcoin protocol is secure and has never been compromised, numerous exchange hacks have proven that weaker links in the chain will always be susceptible to exploitation. For both ideological and practical reasons, then, HOLDVEST is committed to decentralisation.

Viable decentralised exchanges (DEXs) have only just started to gain a degree of popularity in the cryptocurrency world, and have some way to go before they will replace centralised services. The liquidity and speed of these DEXs must compare favorably with traditional crypto exchanges before they see a high degree of adoption. HOLDVEST's long-term strategy is to integrate DEXs as they arise, helping to add liquidity to them and bootstrapping their popularity whilst benefiting from their superior security.

There will be 2 stages of this implementation process:

1. Integrating cold wallet functionality

Having an external (ideally cold-storage) wallet is vital for users' confidence and security. The first stage will be to enable users to withdraw funds to their own private wallets, whilst still making all of HOLDVEST's services available to them. This step will involve the creation of a protocol that signs transactions offline to maintain the air gap between the cold wallet and the exchange platform, thereby combining unbeatable security with HOLDVEST's full suite of portfolio management functionality. Funds will, of course, need to confirm on the blockchain before they can be deployed within HOLDVEST.

2. Execution of trades on DEXs by submitting orders signed from cold wallets

The increasing sophistication of this system and its integration with new and existing DEXs will provide instant execution of trades without sacrificing the 100% security of user funds. There will be no reason to transfer money to a centralised service, no matter what security measures it has in place.

Over time, we anticipate that a growing number of trades will be met directly from our own userbase, with HOLDVEST fulfilling orders directly between them on a peer-to-peer basis using its internal matching engine. This will further decrease the reliance on third-party and centralised exchanges. The creation of a full-blown decentralised exchange is the natural development and goal of this strategy.

The HOLDVEST Protocol and Foundation

Holdvest will be open sourcing some of its core components to the Holdvest Foundation.

The Holdvest Protocol is the name of the underlying protocol on which the Holdvest platform runs. This will mean standardising the API and architecture of the platform's liquidity aggregator protocol.

Ultimately, the intention is to create a combined protocol for connecting to both centralised and decentralised exchanges. This will enable secure trading across blockchains, accessing liquidity from across the entire sweep of the crypto markets.

Holdvest Protocol overview

The Holdvest Protocol is a standard for connecting to centralised and decentralised exchanges' orderbooks, allowing the creation of dApps to provide robust services for buying and selling any cryptocurrency at the best price the market has to offer at the time. There is no other protocol that exists in the market right now which does this. A few that do are specific to DEX and only for Ethereum (0x protocol for example). Holdvest protocol can support multiple currencies, both DEX and centralized exchanges.

There is a growing need in the crypto world for secure, reliable, trustless cross-blockchain exchanges. Holdvest unifies connections to many existing exchanges, providing standardised API access to all of them. Whilst every exchange has differences in data formats and methods of connection and making calls, Holdvest will hide these behind one single API format.

Beyond this standardisation, the platform will provide smart routing and price splitting functionality, searching out the best price and required liquidity across every exchange. Thus a large order may be split into smaller segments and executed across different exchanges, even if any single exchange lacks the orderbook depth to fulfil the whole trade at once. Especially for less popular pairs and more thinly-traded markets, this solves the problem of slippage and poor execution price.

The Holdvest Protocol also includes modules for standardising portfolio management, storing, tracking and calculating profit and loss for executed trades; for managing crypto index funds; and for providing liquidity for lending.

Holdvest Protocol architecture

The Holdvest Protocol uses a modular architecture of distributed and decentralised services that fulfill all their settlement on the Waves blockchain. The result is that these services and components can provide exceptional performance as well as the ultimate security of being verified by the blockchain, with funds locked and secured by smart contract. One of the additional advantages of this best-of-both-worlds approach is that modules can be updated and substituted without affecting the overall functioning of the protocol, so no downtime is necessary when improvements are made.

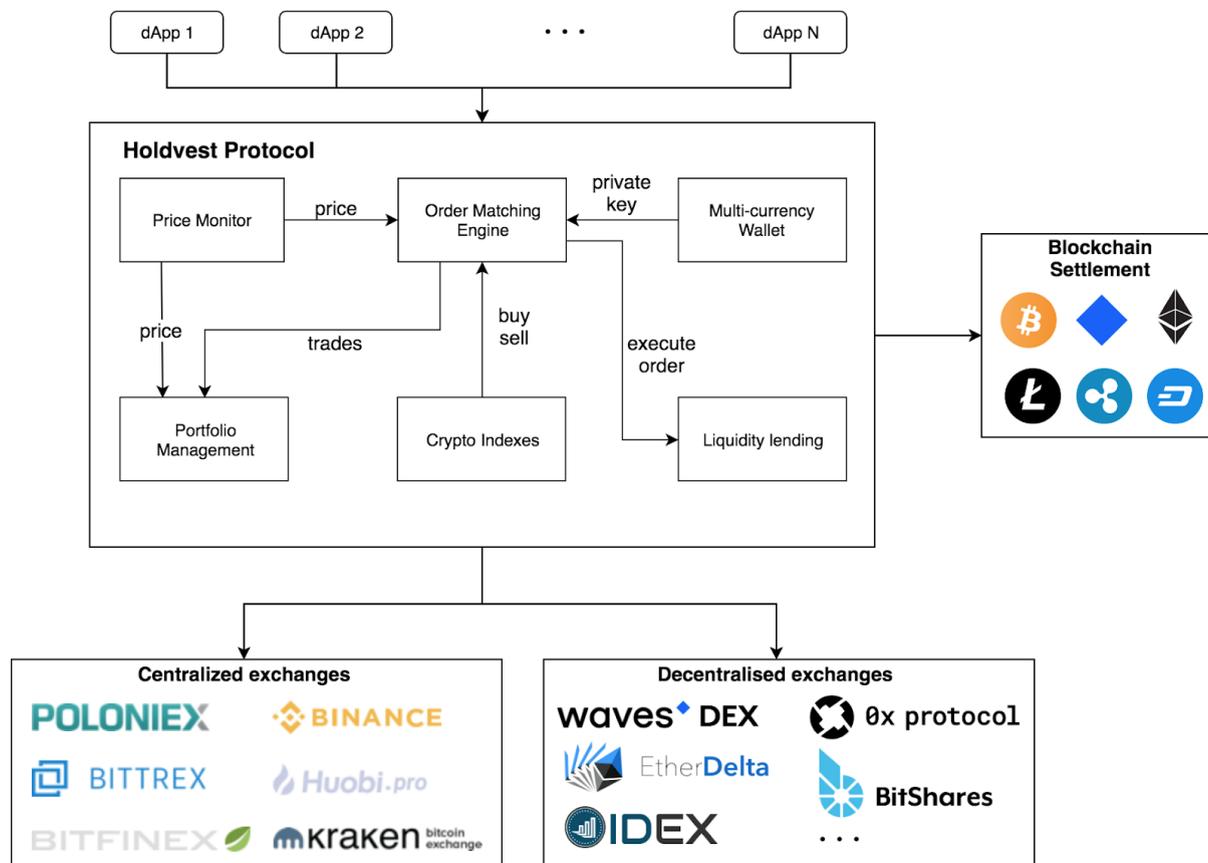


Figure 1. Holdvest Protocol architecture

The majority of Holdvest's core components will be open-sourced to the Holdvest Foundation, which has a number of purposes. Firstly, the Holdvest Protocol will standardise the API for the different elements of its liquidity aggregator, providing a common 'language' for connecting to any exchange.

Secondly, Holdvest will create a marketplace for dApps built on top of its protocol. Some examples of dApps that might be built include:

- Arbitrage apps
- Algorithmic trading bots
- Investment funds
- Payment integration systems

The network of components that comprise Holdvest's marketplace can be developed and enhanced by third parties, ensuring greater quality and availability of functionality. Developers can earn an income when others use their modules. For example, anyone can create a Price Discovery Module for a new exchange and join the Holdvest network. They will be rewarded for providing this service with HDL tokens. Participation in the Holdvest ecosystem also has the benefit of sharing liquidity across the network and new exchanges.

Holdvest is the first reference implementation of all of the core components of the Holdvest Protocol, as well as being the first and major liquidity provider. Over time, more implementations will be added and will work in parallel to Holdvest – improving reliability, performance and stability of the protocol.

From a technical standpoint the Holdvest Protocol complies with a microservices architecture in which all components are independent services or daemons that register themselves in the Holdvest registry and are discoverable by clients. E.g. a price service for a new exchange is simply a standalone service with its own database that implements the standardised Price module API, and adapts the API of that particular exchange, hiding any differences inside the module.

Holdvest Protocol: components and modules

Order matching engine

The task of the order-matching engine is to ensure that trades are executed at the most advantageous price by accessing the lowest asks and highest bids across all available exchanges.

When a new order is received, the engine first tries to execute it on the internal orderbook. If this does not give the best price it then uses data provided by the Price Discovery Module to find the exchange or exchanges to which the order should be sent, depending on the required amount and the depth profile of each exchange.

Based on the results of this analysis the order is split up and submitted to the relevant exchanges. (To fill a large order, or an order for a less-popular pair, the trade will typically be split into small pieces across a number of different exchanges; in other circumstances, one exchange might offer the best price for the amount required.) Following successful execution these trades are consolidated and the client is notified of the completion of the order.

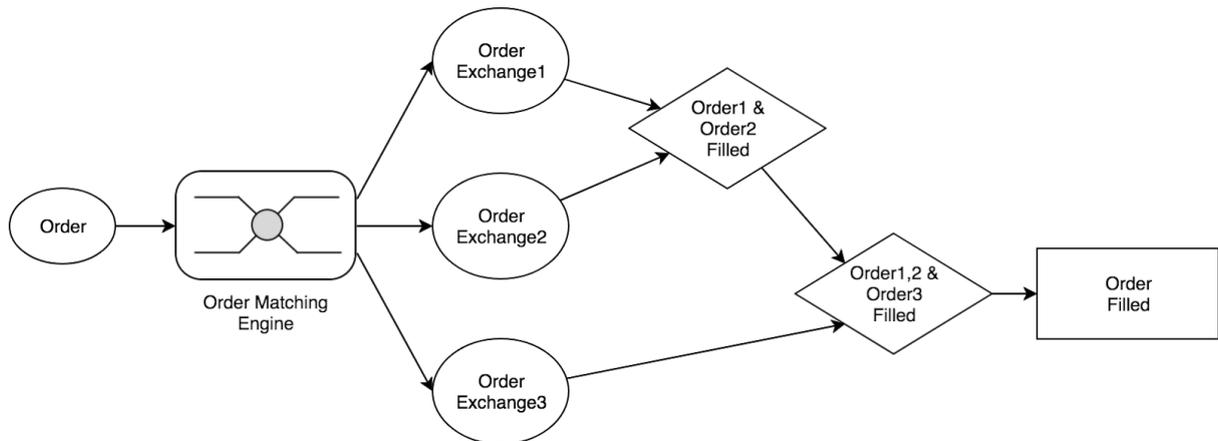


Figure 2. Order split and smart routing

Orders can have one of the following statuses:

- New
- Accepted
- Filled
- Partially filled
- Canceled
- Partially canceled

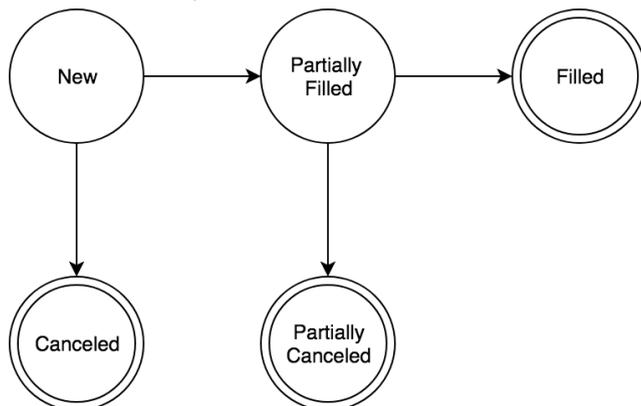


Figure 3. Order statuses

The following is an example of an API call for such an order. Smart routing and price splits are automatically included

```

interface Order {
  // Client(dApp) address in the system
  clientAddress: string;
  // The traded currency pair, e.g. BTCUSD,ETHBTC, etc.
  symbol: string;
  // Order side: Buy/Sell
  side: string;
  // The amount in units of the base currency the Client wants to
  buy/sell on exchange
  amount: decimal;
  // Limit price
  price: decimal;
}
  
```

```

// The address of the Holdvest Protocol escrow smart contract
escrowAddress: string;
// How many HDL tokens the Client will pay as a fee
protocolFee: double;
// Order type: Market, Limit, Stop, StopLimit and others
ordType: string;
// Time in force: GoodTillCancel, FillOrKill, GoodTillDate, etc.
timeInForce: string;
// Order expiration time (unix timestamp in seconds)
expirationTimestamp: integer;
// The order status:
status: string;
// Actual filled order amount in base currency
actualAmount: decimal;
// Actual order cost in quote currency
actualCost: decimal;
}

```

The trading interface supports different order modes, including fillOrKill, market and limit orders.

A 'smart search' is used to discover the right exchanges for the order – that is, the ones with the right combination of price and liquidity. When the Order Matching engine splits the initial order and finds the best exchanges on which to execute them, the final step is to find ExchangeExecutors that eventually create, submit and watch for filling of the native orders. The Holdvest Protocol unifies the process for working with both centralised and decentralised exchanges, leaving all the differences to be dealt with only by the specific executors. (In short, CEX executors work with API keys where DEX executors sign orders write from the multi-currency wallet using a private key.)

There two principally different mode of executors: a direct executor, which works with the funds held on their own accounts (either via API key or a private key); and proxy executors that lend the required funds via a shared liquidity pool, for circumstances in which a dApp does not have enough liquidity of its own on a particular exchange. Clients can therefore use their own funds on exchanges, in which case they will first need to provide API keys to give the engine access, or lend funds to a liquidity pool on different exchanges.

Centralised exchanges

The centralised ExchangeExecutor is simply an adapter for a particular exchange that can send Buy or Sell limit orders using the provided API key, and monitor them for fulfillment.

Decentralised exchanges

A decentralised exchange (DEX) module is designed to connect to a DEX in the same way that the order-matching engine connects to a centralised exchange. The nature of a DEX

and the way it operates means that the API functions very differently and additional concerns must be considered. The ExchangeExecutor for a DEX uses a private key provided by a multi-currency wallet (see below) to generate, sign and validate transactions tailored for the DEX on different blockchains. Because the transactions are signed before sending, the private key does not need to be exposed to the web. Nevertheless, security for this operation is paramount.

Where orders are executed internally, e.g. on Holdvest's internal DEX, atomic swaps can be used. These employed Hashed Timelock Contracts (HTLC) to exchange pre-determined amounts of cryptocurrency in their entirety (hence 'atomic'), or not at all. Partial orders are not possible.

Multi-currency wallet

A multi-currency wallet comprises a set of tools that is stored securely on the client's computer or mobile phone, and that supports different cryptographic functions and connectivity for many blockchains. Support for new currencies will be added gradually with the help of the Holdvest development community.

A set of easy and user-friendly tools will be integrated with the Holdvest Protocol, such as functionality for depositing and withdrawing currencies; sending HDL tokens to the escrow smart account; signing DEX orders for ExchangeExecutors; and integration with a Portfolio management module to provide a history of operations and calculate the cost and profit of trades, amongst others.

Price discovery

A price discovery module comprises a pluggable architecture that offers a feed of live prices from exchanges in real time. A new plugin can easily be written by creating a simple interface and presenting exchange information within it. The module displays last price but also analyses exchange orderbooks to show volumes and depths. Whenever possible it attempts to update and push results to the user, connecting to the exchange via web socket. When not available it falls back to using a pull-based mechanism, constantly checking the exchange's REST API.

The price discovery module also aggregates and interprets historical prices, giving a feed to connected clients and a UI with prices for plotting charts by different time-frames and periods.

Providing price data will be charged in HDL tokens from the client. Developers can run their services with 99.9% uptime, receiving a fee for providing that data.

Portfolio management module

The portfolio management module supports a range of functions for smart portfolio use, including trading history, current balance, and profit/loss. It also allows users to compare different trading strategies.

Crypto index funds module

This module consists of the set of API calls required to create a custom index fund, providing a list of currencies and the proportion of the index they comprise in percentage terms. Indices can be public or private. The module also includes the API calls needed to buy/sell each index, which are internally unpacked into separate orders relating to their underlying currencies and submitted to exchanges for execution by the Order matching engine. Additionally, there are APIs for price feeds using the prices of each constituent currency.

Liquidity lending module

When a client using the protocol does not have sufficient funds on certain exchanges, he can opt in to lend the necessary liquidity to a common pool. All final settlements are performed on the Waves blockchain and guaranteed by a purpose-designed Smart Contract Escrow Account.

When a pool receives a request to execute a given order, it searches the stakeholder(s) able to execute it based on various criteria such as the rating of each stakeholder, its fees, available funds etc. Once found, stakeholders execute requested orders from their account on the centralised or decentralised exchange. During execution the order is guaranteed by a Smart Contract Escrow Account, so that the parties receive the full amount of the right currency and their HDL tokens for the commission fee.

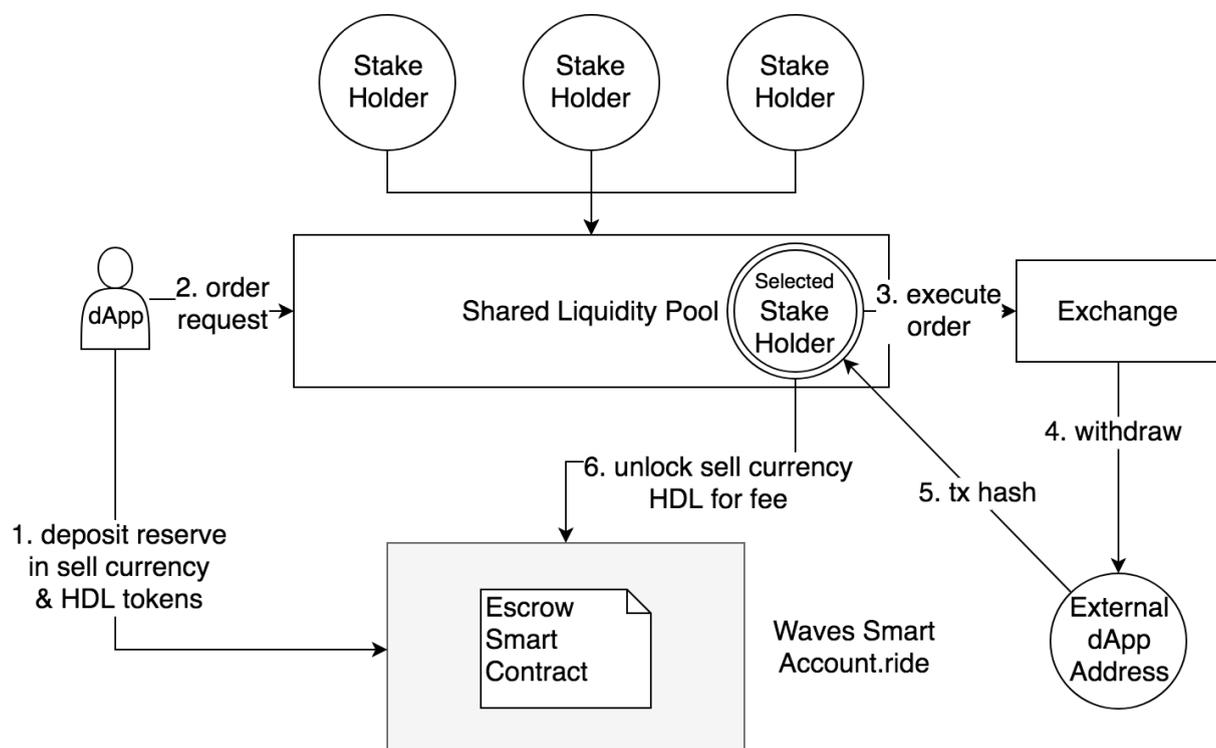


Figure 4. Shared Liquidity Pool with Escrow Smart Contract

The client first needs to deposit the necessary amount of the currency to sell and HDL tokens to the Smart Contract Account with a time lock. Within that amount he can execute trades and create a portfolio.

All lenders provide their stake for overall liquidity (common pool). When they receive requests from the Order matching engine they execute trades on their own account on the relevant exchange. Lenders receive fees in HDL, when the initial request is fully closed. This can be done in two ways:

- The lender withdraws bought currencies to an external address, and provides proof with the transaction hash to the Waves Smart contract address to unlock sell currencies and HDL tokens for commission fees.
- The counter order is received that closes the initial open trade. The lender then receives a commission fee in HDL.

dApps marketplace

A wide variety of applications can be created for the Holdvest Protocol, including for investment, trading bots and payment gateways. The Protocol will be used extensively for every decentralised application in the marketplace. The first dApp running on the Holdvest Protocol will be Holdvest itself, the reference implementation that will provide a liquidity aggregator, portfolio management and an ICO platform. Within Holdvest's dApps HDL will function as a utility token, being used to pay for all services, including for commission fees and within its lending model.

Example scenarios

Scenario 1

A blockchain fund wants to buy a total of 10 BTC of Ethereum.

1. The fund sends 10 BTC to the Holdvest Smart Account address with a time lock period (depending on the blockchain parameters of the received currency). It can choose to pay trade fees in HDL tokens, or subtract this from the BTC amount.
2. A Send request is made to the Order matcher to buy Ethereum for the total amount of BTC, also providing an Ethereum address.
3. The Order matcher splits this across three exchanges: the Waves DEX, Bittrex and Poloniex.
4. The three orders are executed. Three withdrawal requests are initiated, and so there will be three ETH transactions to transfer the resulting funds to the Buyer's address.
5. A transaction hash for each of these three transactions is provided as proof in order to unlock the BTC from the Holdvest Smart Account address. The transfer from that address can be made only by the stakeholders who provided liquidity to execute corresponding orders on exchanges.
6. If for some reason a buyer hasn't received the ETH to his account after the lock period ends, he can receive the locked BTC back.

Scenario 2

A multi-currency terminal provides the following functionality to users:

1. Subscribe to the service
2. Pay monthly fee in HDL token
3. Relevant exchanges and altcoins of interest can be selected
4. Real-time price feeds are delivered

Scenario 3

Trading using funds held by the dApp itself.

1. The dApp deposits HDL tokens to an account used for fee payment.
2. The dApp send a request to buy/sell a given amount of a particular currency, providing the API key for exchanges where it has funds.
3. The Order matching engine module finds the best prices across the relevant markets, splits the initial order and returns the list of orders to be submitted to different exchanges.
4. The dApp must provide an API key for a CEX with sufficient funds on account, and a signed order must be submitted to DEXs using a private key from a local multi-currency wallet. All orders are executed by corresponding direct ExchangeExecutors.
5. The OrderWatcher is notified about the status of each order. The fee in HDL tokens is deducted from the dApp account for filled orders.
6. Filled trades are published to the Portfolio management module for further tracking and analysis. The purchased coins remain on the dApps exchange account until withdrawn, or in the cold wallets for DEX trades.

Roadmap

HOLDVEST has been in development for a year, with core functionality such as the liquidity aggregator already completed. The platform will remain under constant and active development, starting with the improvement of current features, support for additional cryptocurrencies plus implementation for ICO investment, asset and portfolio management, the crypto index funds marketplace and ultimately a fully decentralised platform.

- **March 2018: Initial production-ready version of HOLDVEST launched**
- **May-June 2018: Public ICO**
- **Q3 2018: Platform improvements and optimization**
 - Optimization of trading engine
 - Price signals
 - Stop loss and limit orders
 - Multi-portfolio strategies

- **Q3 2018: Mobile app release. iOS and Android version of HOLDVEST portal**
- **Q4 2018: Start of HDL token buyback programme**
- **Q4 2018: Crypto Index Funds launch**
 - Open market of integrated crypto index funds
 - Asset management
 - Index fund managers' rating
 - User investment in crypto index funds
- **Q1 2019: Fiat gateways**
 - Support for fiat currencies integrated (USD, EUR, etc)
 - Deposit/withdrawal via Visa/MasterCard
- **Q1 2019: Decentralised exchange**
 - Fully functional exchange with fast trading, cold wallets and low fees

HDL utility token

All major activities on the HOLDVEST platform can be paid for with the HOLDVEST utility token (HDL). Whilst other currencies will be accepted, paying with HDL will secure a discount for fees and other functions. Non-HDL payments will be converted to HDL in real-time at the best price on any available exchanges. As with all of its supported ICOs in the future, HOLDVEST itself will be the initial trading platform for the HDL token. Additionally, HDL will be the currency of payment for all services provided by the Holdvest Protocol.

Token functions and benefits

Similar to the tokens integrated with existing exchange platforms such as Binance, HDL will give holders a range of benefits, plus additional functionality that will add further value to users.

The token will be integrated with all of the main transactions that take place on the platform, thereby taking the form of an internal currency or utility token. By holding and using it, HDL owners will be able to access Premium services and generate extra profits from various operations on the platform, as well as participating in the buyback programme that will help to maintain and increase the token's value.

The functions of the HDL token include but are but not limited to:

- **Discounts on trading fees.** Users will be able to save up to 20% on standard trading fees by paying with HDL. Since fees are typically calculated as a proportion of order size, if HDL tokens rise in value then a smaller amount will be required to pay the equivalent value in the traded currencies. Buying HDL at ICO therefore represents the ability to pre-purchase trading activity at a favourable rate.

- **Buyback program.** When an order is fulfilled on a trade and the user does not pay fees with HDL, a standard commission is charged as a percentage of the total order amount. When the HDL buyback program is started, every such operation on the HOLDVEST platform is immediately converted to a market BUY order for HDL tokens across supported exchanges. Therefore *every* trade represents demand for HDL.
- **Decreasing supply.** 50% of tokens submitted as fees (or bought using trading fees in non-HDL currencies), or otherwise used in payment for services on the HOLDVEST platform, will be burned. This is achieved either by destroying them with the functionality built into the Waves token launcher or by sending them to a provably unspendable address. This will decrease supply over time and place constant demand on the market. The remaining 50% of HDL collected in day-to-day activity will be held by the team. This can more succinctly be stated as: **HDL tokens equivalent in value to 50% of all profits collected by HOLDVEST will be burned.**
- **ICO listing and voting.** The HDL token can be used to participate in platform development. This includes voting to list new cryptocurrencies and to support new ICOs; rating ICOs in terms of business model and trustworthiness of teams as a form of collective due diligence; and implementing new functionality of various forms on the platform.
- **Advertising.** One of HOLDVEST's revenue streams will come from selling advertising space on its platform. HDL will be the default token of payment for this service.
- **Unlocking advanced features.** Users who hold HDL tokens within their portfolios will be able to unlock additional premium services on the platform. They will gain access to margin trading; be able to set advanced trading orders that are not available to other users (Limit orders, Stop market and Stop-Limit orders), as well as controlling Stop Loss and Take Profit parameters; and be sent alerts for arbitrage opportunities and other useful features that will allow them to generate additional profits.
- **Holdvest Protocol payments.** Every service and all dApps offered within the Holdvest Protocol will be charged using HDL. Developers who upload dApps to the Holdvest marketplace will be able to charge customers for using them. Fees are set by the developers, with users deciding whether they offer value for money or not.

Example of token buybacks from trading fees

Alice spends 10 BTC to buy ETH on the HOLDVEST platform. She does not hold HDL tokens and pays fees in BTC. Because HOLDVEST is a high-volume trader, it can access lower fee tiers on its partner exchanges. These savings are passed on to Alice and she is charged a total of just 0.2%, or 0.02 BTC.

This is immediately converted into HDL tokens, which are bought in real-time at the most advantageous price using HOLDVEST's liquidity aggregator operating across several exchanges. The average price secured is 0.0001 BTC, which means 200 HDL are purchased. 50% of these (100 HDL) are immediately burned. The remaining 100 HDL are retained by the HOLDVEST team as revenues to pay for servers and other infrastructure overheads, wages etc.

At the same time, Bob also buys 10 BTC worth of ETH on the platform. He opts to pay fees with HDL tokens, meaning that he gains a 20% discount and pays the equivalent of 0.016 BTC in HDL, or 160 tokens at current market price. 50% of these tokens are also burned, or 80 HDL, with the remaining 50% being held by the HOLDVEST team.

HOLDVEST token sale

The HDL utility token will take the form of a custom token created on the Waves platform. After distribution it will immediately be possible to trade it on HOLDVEST's internal exchange, or to withdraw it to an external Waves wallet and trade it on the integrated Waves DEX. HDL will be created as a non-reissuable token, and its supply will only ever decrease over time.

Participation in HOLDVEST's ICO will be extremely straightforward and will be used as a showcase for the company's technology and user experience. The process will be performed entirely on the HOLDVEST.com platform. Users are simply required to register with the portal at <https://holdvest.com>, deposit a balance with one or more of the many supported cryptocurrencies including BTC, BCH, ETH, LTC, DASH and WAVES, and buy HDL tokens with one click.

After the ICO is over, HDL tokens can be traded on HOLDVEST's internal exchange, which will be the first marketplace for trading prior to listing on other exchanges. Users will be able to buy and sell tokens directly from their HOLDVEST accounts.

ICO summary

What is HDL?

HDL is the HOLDVEST.com utility token. The value of HDL will depend on the fees earned by the platform, including commission fees on trades and for additional premium services.

Pre-ICO schedule

00:00 UTC Tuesday 8 May 2018 to 19:00 UTC Thursday 12 May 2018

Pre-ICO price

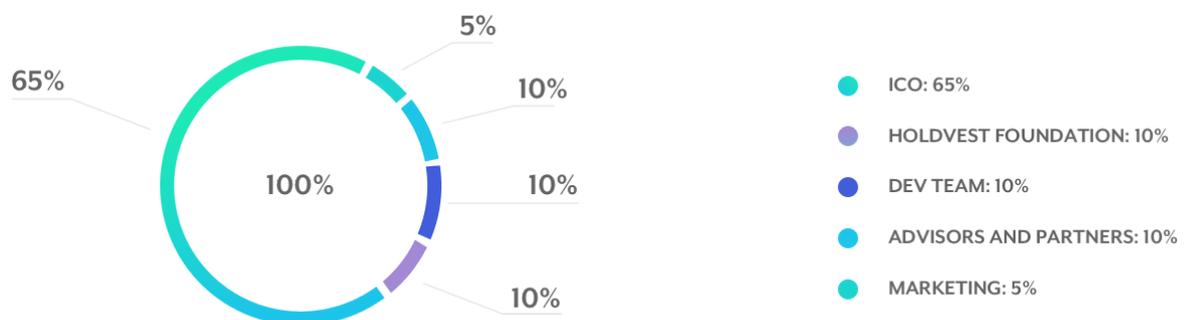
1 HDL = 0.0001 BTC with discounts for early participation.

ICO schedule (assuming hard cap not reached)

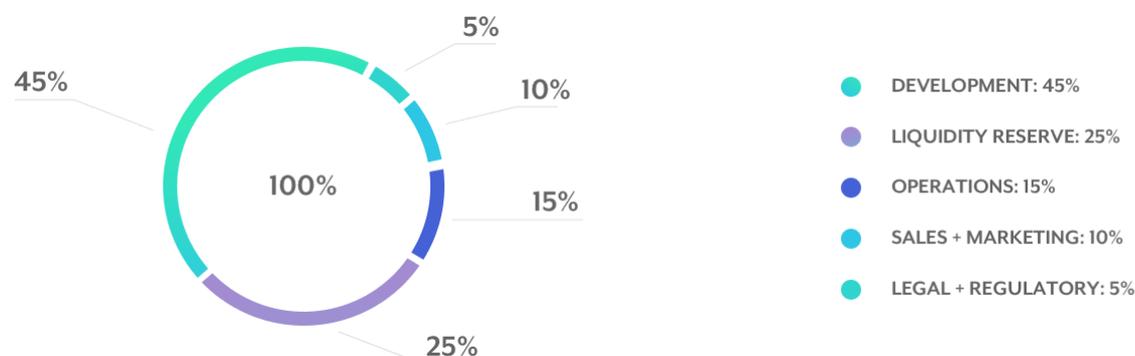
00:00 UTC Wednesday 27 June 2018 to 23:59 Thursday 26 July 2018

ICO HDL price	1 HDL = 0.0001 BTC with discounts for early participation.
HDL token supply	Fixed after ICO. Unsold tokens will be burned.
Token distribution	<ul style="list-style-type: none"> • ICO: 65% • Holdvest foundation: 10% • Dev team: 10% • Advisors and Partners: 10% • Marketing: 5%
ICO platform	<p>HOLDVEST.com</p> <ol style="list-style-type: none"> 1. Investors buy HDL tokens directly from their HOLDVEST account 2. HDL tokens appear in users' portfolios immediately 3. After ICO ends investors can withdraw HDL tokens to their external Waves wallets
Currencies accepted	BTC, ETH, BCH, LTC, DASH, WAVES and other currencies supported by HOLDVEST.com
Blockchain	Waves (token)
Soft cap	USD \$500,000
Hard cap	USD \$5,000,000
Refund	If the soft cap is not reached, all funds will be returned to investors
Global participation	Allowed

Token distribution



Funds distribution



Team

Igor Pletenev

Chief Executive Officer

Igor is an experienced entrepreneur, IT industry professional with active experience in a number of blockchain projects. He is responsible for whitepapers and business plans, implementing the project roadmap, platform architecture and executing the overall strategy of HOLDVEST's mission.

<https://www.linkedin.com/in/igorpletenev>

'HOLDVEST significantly lowers the barrier to starting investing in cryptocurrencies and blockchain projects by removing the difficulties of finding the most promising instruments, creating wallets, transferring funds and controlling your earnings.'

Alexey Koloskov

Chief Technology Officer

Alexey is a blockchain developer and the chief architect and creator of the Waves decentralised exchange (DEX). He has extensive experience in developing and managing banking software. Over past several years he has established a reputation as an active and expert participant within the community of blockchain developers.

<https://www.linkedin.com/in/alexey-koloskov>

'During development of the Waves DEX I became 100% assured of the need for decentralised systems. Still, there is a need for an intermediate solution that fills existing gaps and problems of liquidity, complexity and low speed, bringing together dozens of centralised and decentralised exchanges under one roof. HOLDVEST will constantly integrate new DEXs as they become more popular, according to its strategic plan of replacing centralised services.'

Maksym Lavrinenko

Chief Marketing Officer

Maksym is experienced entrepreneur and crowdsale specialist with a focus on data-driven marketing, behavioural analytics and effective online marketing. With such experience our project will gain the traction necessary to go from startup to big business company.

<https://www.linkedin.com/in/maksym-lavrinenko>

'When pitching the idea of the product to users I only use several word: HOLDVEST is all-in-one platform that you ever need for blockchain investment and trading.'

Vadim Lashkov

Project Manager

Vadim is an expert in the development of investment products. He is responsible for design, deployment and organisation of all technology-related processes, providing key expertise and supervision.

<https://www.linkedin.com/in/vadim-lashkov-530132136>

'HOLDVEST combines easy-to-use trading functionality with extensive portfolio management. Buying and selling has to be no more complex than pressing a single button. Implementing such a solution is not possible without a core team of professionals united by a common goal.'

Dima Lebed

Lead Software Developer

A professional software developer, architect and blockchain evangelist, Dima has architected and developed complex and high-load projects with a focus on trading and enterprise integration.

<https://www.linkedin.com/in/dima-lebed-36a11b53>

'The architecture of our unique trading engine is specially tailored towards quickly and easily connecting new exchanges, in order to prepare for rapid growth.'

Allen Artamonov

IT Project manager

Allen has vast experience in project management, digital advertising, and assurance and consulting in various fields, primarily in the financial and banking industries.

<https://www.linkedin.com/in/allen-artamonov>

'I'm focusing on bringing the top-quality standards that are well-known for banking solutions to blockchain projects, to provide customers with smooth transitions between the two.'

Conclusion

HOLDVEST is designed to meet a series of needs in the fast-growing crypto world by addressing a number of flaws in the efficiency and usability of current crypto exchanges.

The platform's flagship liquidity aggregator engine is fundamental to this aim. The engine analyses prices on a large number of crypto exchanges in order to fulfil customer orders, which can be split into several trades across different markets. This functionality is accessed from a single web or mobile portal with a convenient interface and powerful tools for more advanced traders, whilst allowing a single, unified fee for commission and withdrawals. Thus HOLDVEST combines the best features of an exchange, brokerage and instant conversion service, and means that users only need to register with one website to benefit from potentially dozens of markets. Support for both investing in popular ICOs and launching custom ICOs will be included, with users engaging with these opportunities directly from their accounts and HOLDVEST providing the first exchange for the new tokens.

All economic activity on HOLDVEST directly or indirectly uses the HDL token. Trading fees and charges for other services like margin trading or advertising can be paid in HDL for a 20% discount, or if paid in other currencies then are converted immediately to HDL. 50% of all HDL received are burned to reduce supply and maintain constant demand, whilst the remaining 50% are retained by the HOLDVEST team. HDL will also be used to vote on platform upgrades and other features.

HOLDVEST is the first initiative to deploy such an innovative set of technologies within the user interface of a traditional crypto exchange, dramatically lowering the barrier to accessing the crypto markets, reducing costs and streamlining the user experience far beyond anything currently available.

For more information, visit <https://holdvest.com>.