OMEGA**ONE**

Whitepaper

Version 1.1
8/29/2017

Table of Contents

Mission

A secure, efficient, decentralized and digitally native global financial system is being born on the blockchain. It will restructure global power dynamics and fundamentally impact tomorrow's world. Our mission is to facilitate the birth of this new financial system and to shape it for the common good.

By solving the problem of creating scarcity in a purely digital space without the need for centralized power to create trust and security, the blockchain has enabled a decentralized market of value which will automate most functions of the financial industry in more transparent, efficient and secure ways. Omega One is building out the investment architecture of these natively digital asset markets, improving their viability as a foundation for the new financial system and helping to shape that emerging system toward better societal outcomes.

Vision

Despite massive growth in crypto markets, exchanges and other market intermediaries remain illiquid, fragmented, costly to trade on, and open to theft by hacking. Omega One solves these problems by providing traders, investors and institutions with a decentralized automated trade execution system that intelligently implements their trades across the world's crypto exchanges, shielding them from counterparty risk and reducing their costs of trading. By radically increasing the liquidity of crypto markets, we are laying the foundation for their maturation as an asset class and building the financial system of the future.

Our decentralized, automated trading intelligence interfaces between crypto exchanges and blockchains, using our balance sheet to enable our members to realize liquidity many times greater than available directly in the market, by both generating liquidity within the platform and breaking larger orders into small pieces that are placed across all market venues simultaneously.

By giving this trading intelligence its own balance sheet, cold storage vaults, and insurance, Omega One also intermediates trust between blockchains and exchanges, allowing trading members to retain custody of their funds. For ERC20 tokens initially, and eventually for tokens across all blockchains, Omega One provides pure trustless atomic swaps in settlement of orders and mediates risk between its members and the markets.

Omega One operates using a crypto-economic protocol, mediated by the Omega Token (OMT), a cryptographic token that provides membership access and can be used to pay trading fees. Higher balances of OMT allow members access to preferential liquidity treatment and discounted trading fees. OMT is an Ethereum (ERC20) tradable asset. Tokens will be sold to members initially in a token auction, and then after launch on an ongoing basis.

By solving liquidity and trust problems, foundational requirements for any financial system, Omega One will reduce barriers to capital flow into and between crypto assets, improving the efficiency and viability of the emerging crypto economy, smoothing market booms and busts, and enabling the development of more sophisticated capital allocation structures.

Team

The Omega One management team have launched multiple startups, traded one of the largest private crypto funds in the world, and patented a multi-trillion-dollar fiat trading platform. Our engineers have built exchanges in both traditional and crypto markets, as well as working on core components of the blockchain ecosystem, including the Casper protocol on Ethereum. Omega One is a ConsenSys Mesh Company, benefiting from the world's leading blockchain and token talent. Full team bios are available at http://omega.one/team

Alan Keegan
Chief Executive Officer
(Bridgewater Currencies
and Macro Research)

Alex Gordon-Brander
Chief Technology Officer
(Bridgewater FX Trading
and Tech, MarketAxess,
ConsenSys)

Mark Bakacs
Chief Strategy Officer
(Linklaters, Barclays
Capital, Ideapod)

Jon West
Chief Trading Officer
(Digital Currencies at
Novogratz Family Office)

Amanda Gutterman
Chief Marketing Officer
(HuffPo, Slant,
ConsenSys, Forbes
30under30)

Ron Garrett
Chief Operations Officer
& Consensys Liaison
(ConsenSys, Bitly)

Rick Dudley
Blockchain Architect
(ConsenSys, Vulcanize)

Karl Floersch
Smart Contract Engineer
(Citi, Riverbed,
ConsenSys)

Joseph Lubin
Advisor
(Ethereum Co-Founder,
ConsenSys Founder)

Juan Llanos
Compliance and Risk
Advisor
(Bitcoin Foundation,
Bitreserve, ConsenSys
Enterprise)

Technology Partners

ConsenSys is the world's leading blockchain company. A venture production studio and custom software development consultancy, ConsenSys builds decentralized applications (DApps), enterprise solutions and developer tools for blockchain ecosystems, focused primarily on Ethereum. Powered by smart contracts and secured through encryption, ConsenSys applications provide the benefits of transparency, auditability, and immutability that are unique to blockchain-based solutions.

The Problems Solved By Omega One

There are three fundamental limitations on trading in the crypto markets today:

- **A lack of liquidity,** causing realized costs of trading to be often many times higher than published commissions and fees
- **A lack of security,** in which the most liquid transparent venues come with risk of loss due to hacking
- **A lack of transparency** into the actual costs of trading

Collectively these three issues are stressing the markets, making them susceptible to booms and busts and creating a barrier to entry for the institutional players - such as traditional asset managers - whose presence will take the crypto markets to the next level of maturity.

Omega One is designed to address all of these issues.

Lack of Liquidity

Liquidity is the ability of a market to absorb transactions without a change in price. While crypto market liquidity has recently increased alongside trading volumes and valuations, even BTC and ETH are still far less liquid than traditional markets. This is because the total value of the asset class is still much lower than these markets, and because liquidity is fragmented across many exchanges.

For instance, buying $1m worth of EUR vs USD tends to move the price by ~0.01%, while buying $1m of ETH vs BTC will move the price by 1%-10% depending on conditions, or 100-1000 times the most liquid traditional markets. This can cost traders up to 25 times as much as the published exchange fees, but since the extra costs are hidden in the price of the purchased asset they are often not fully accounted for.[1] For the less liquid crosses (trades between one crypto asset and another), even greater liquidity costs are incurred.

Omega One will provide enhanced liquidity by offering a private dark pool and trading algorithms connected to all the world's crypto exchanges.

Lack of Security: The Liquidity vs Security Tradeoff

The most transparent and accessible liquidity in crypto markets is on centralized exchanges, which carry investor funds in commingled accounts that are susceptible to hacking.[2] This has driven many investors into alternative options such as OTC brokers, and has also created a market for a rising number of on-chain trading solutions (e.g. EtherEx) and partially-on-chain peer-to-peer solutions (e.g. Swap).
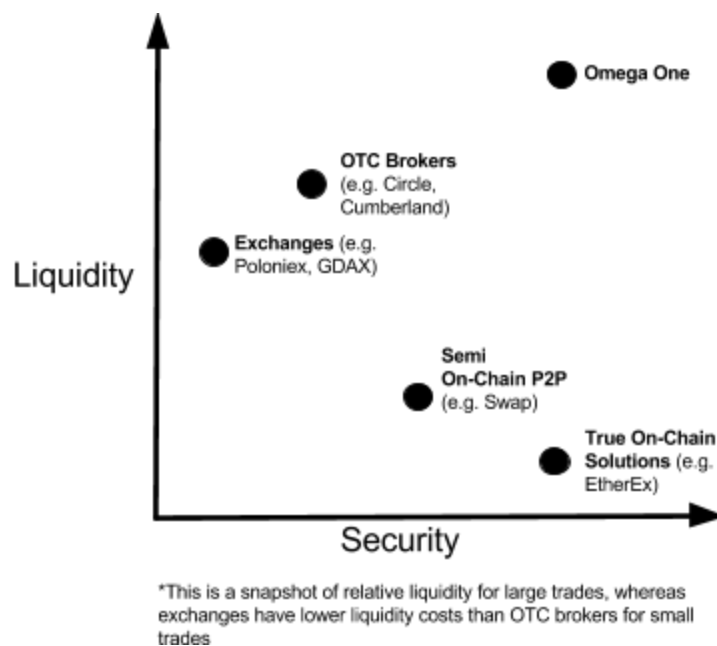
---

[1] For an explanation of liquidity and its impact on the cost of trading please see the section: What are Liquidity Costs and Why Do They Matter?
[2] The current market value of all crypto hacked from exchanges is well over $2bn

Each of these options comes with some kind of trade-off between security and liquidity costs. The off-chain exchanges have the most available transparent liquidity but carry counterparty risk, the OTC brokers allow you to move large amounts of money securely but lack price transparency and conceal high costs (3-8%) in their bid-ask spread, and the on-chain solutions have liquidity constraints that are compounded in some cases by front-running risk.[3] Investors have two options in the present landscape: moderate liquidity with weak security, or weak liquidity with excellent security.

Omega One will provide enhanced security by intermediating between blockchain wallets and on- or off-chain exchanges with our own balance sheet, shielding our members from risk.

*This is a snapshot of relative liquidity for large trades, whereas exchanges have lower liquidity costs than OTC brokers for small trades

Lack of Transparency

Not only are liquidity costs high in this asset class, they are hard to even measure, and many participants do not even realize that they are paying liquidity costs many times greater than explicit commissions and fees. This is a particular barrier for institutions who trade on behalf of clients, and provide "best execution"-like reporting. Until there are trading services that provide transaction cost benchmarking and analytics to these institutions, they will be obstructed from trading in this asset class, hindering the maturation of crypto markets.

---

[3] Because any on-chain order book has a delay between when a trade is publicly known and when it is executed, anyone can front run on-chain transactions.

Omega One will provide enhanced transparency by providing benchmarking and analytics of transaction costs to our members, to allow them to audit the market impact of their trading.

The Solution: Non-Custodial Smart Liquidity

Conceptual Order Flow
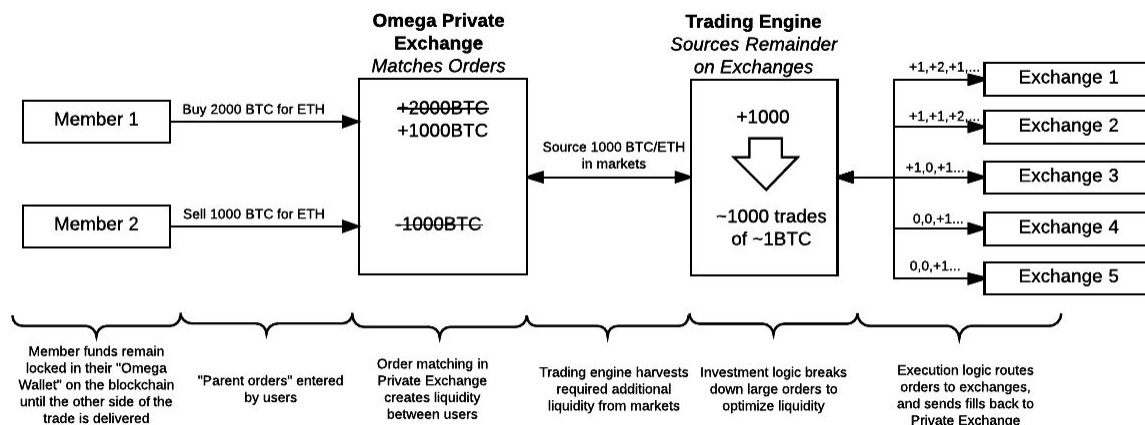
1. Our members enter "Parent Orders", with their desired pair, size, and direction, and optional time and price limit, trading against the funds in their Omega Wallet.

2. The platform crosses parent orders in an internal matching engine (the "Omega Private Exchange"), and passes a "Net Order" to the trading engine for each pair that denotes the total desired unmatched liquidity of the parent orders.

3. Based on the trading engine's assessment of available liquidity it will break chunks of the "Net Order" into "Child Orders" that represent a timeslice of executable liquidity demand for each pair at a given moment.

4. That "Child Order" is then further broken down into "Street Orders" that are the actual orders executed on each exchange (these can be placed as limit orders, market orders, or other order types depending on how the trading logic can best optimize market liquidity).

High-Level Architecture

Omega One is an entirely automated trade execution service that contains a private exchange that matches our member's orders, offloads unmatched liquidity onto public exchanges via a trading engine, and settles directly onto multiple blockchains.
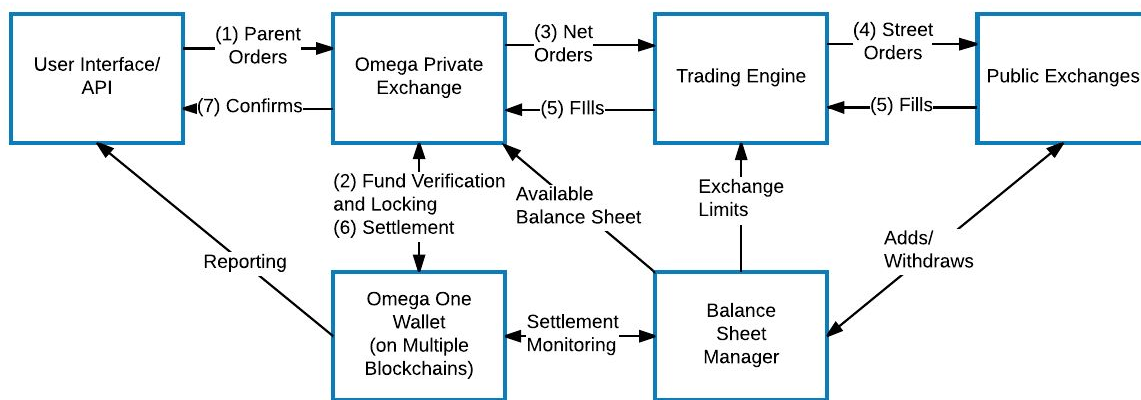
UI/API: Web, Mobile and API Trading

Our members will interact with the Omega ecosystem either through our Mobile and Web interfaces or via our APIs, which allow seamless integration of our trading and analytical functionality directly into their existing technology. Whether through UI or API, members will be able to add and withdraw funds into their decentralized Omega wallets, initiate and monitor orders, and access multi-chain portfolio analytics, reporting, tax and other accounting functions.

Omega Wallet: Portfolio Management

Our members will hold their funds in a decentralized, trustless and non-custodial portfolio called an "Omega One Wallet", made up of a set of linked wallets on multiple blockchains (Ethereum, BTC, Omni, etc.) [individually, "Omega Wallets"]. This wallet is like any other decentralized wallet in that the user retains control and custody of their funds via their private key; however, the wallet has a built-in interface to the remainder of the Omega ecosystem allowing locking of assets, and secure automated settlements. The Omega wallets will hold tokens and crypto assets, including the full range of ERC20 tokens.

When the Omega Private Exchange receives a member Order, it must automatically verify and lock[4] the funds in the relevant Omega Wallet before it marks the order as tradeable. This smart contract locking logic - in addition to using Omega One's balance sheet to intermediate with exchanges - allows Omega One to shield our members from settlement time mismatches across blockchains, and ensures that, for example, in an ETH-BTC transaction, the member's BTC will settle to her wallet on the bitcoin blockchain before the ETH leaves her wallet on the ethereum blockchain, enabling truly trustless trading.[5]

Omega Private Exchange: Dark Pool Matching

The exchange then attempts to match the order with existing orders in the Omega Private Exchange. If matches are found, these existing orders will be partially "filled" with this newly arriving liquidity, according to the Omega Matching Protocol, which preferences orders according to, among other things, the member's Omega Token balance. When an order is completely filled, the Exchange directs the Omega One Wallet Manager to settle funds directly and atomically[6] across blockchains, in a fully decentralized and trustless fashion.

If however, matches cannot be found immediately, the Omega Private Exchange - unlike existing crypto dark pools - does not need to wait for matching parent orders to arrive to provide this member with liquidity. Instead, it offlays its liquidity need to the Omega Trading Engine, so it can harvest the required liquidity from the global marketplace. As the Omega Private Exchange order book is not publicly visible, the unfilled orders cannot be front run as they are being offloaded into public exchanges.

Omega Trading Engine: Liquidity Harvesting

For each unique pair/direction (say, buy BTC vs ETH), the Exchange communicates to the Trading Engine the total net size of unmatched liquidity. The Trading Engine's job is to find that liquidity in the market, make those trades as cheaply as possible, and then fill existing Parent Orders on the Exchange with the fills from those trades.

It does this by monitoring liquidity conditions, managing the velocity at which the "Net Order" in each market/direction is implemented in the marketplace, with a view to trading as cheaply and inconspicuously as possible, and then emitting a stream of "Street Orders" to the exchanges, getting optimal liquidity using tools such as resting orders away from market, breaking down large orders into small ones over time, distributing orders to exchanges in proportion to liquidity availability, as well as more sophisticated proprietary algorithms and arbitrages.

---

[4] A more detailed explanation of the blockchain interactions is below in Detailed Architecture: UI, Wallet and Exchange.

[5] Note that the locking and swapping of funds in the Omega wallets take place on public blockchains (BTC, ETH, Omni, etc.). Until privacy is implemented on these chains (zero knowledge proofs, etc.) this creates some risk of information leakage. However, the actual market interactions are off-chain and private, so this risk is minimal.

[6] To as great an extent as technology allows in multi-chain swaps. In cases where there is no true atomicity, Omega One will deliver the new asset to the client's wallet while the old asset is locked, but before it is removed, ensuring there's never a counterparty risk.

Balance Sheet Manager: Trust Intermediation

Because we keep our members' funds in their Omega wallets, and ensure at all times that they retain custody of their funds (sometimes locked against an outstanding order), Omega One requires a significant balance sheet in order to harvest liquidity from the marketplace and trustlessly serve it up to our members in the Omega Private Exchange. This balance sheet is required for three purposes (See Importance of Balance Sheet section):

- Settlement intermediation: we "grease" the trustless rails across blockchains with our balance sheet enabling our users to never give up custody of funds
- Transaction cost efficiency: we front the funds for large trades and do a single settlement to the blockchain, rather than paying for many micro-trades
- Information leakage: a single member-Omega parent order settlement rather than many micro-trades will leak less information (until technology matures such that the Omega Wallets can be fully private)

At a minimum, we need to keep at least enough funds on all exchanges, across all assets, in order to perform the trades required to satisfy all open Net Orders, bearing in mind both the average length of an order and the time it takes the blockchain to settle the transaction and deliver atomicity.

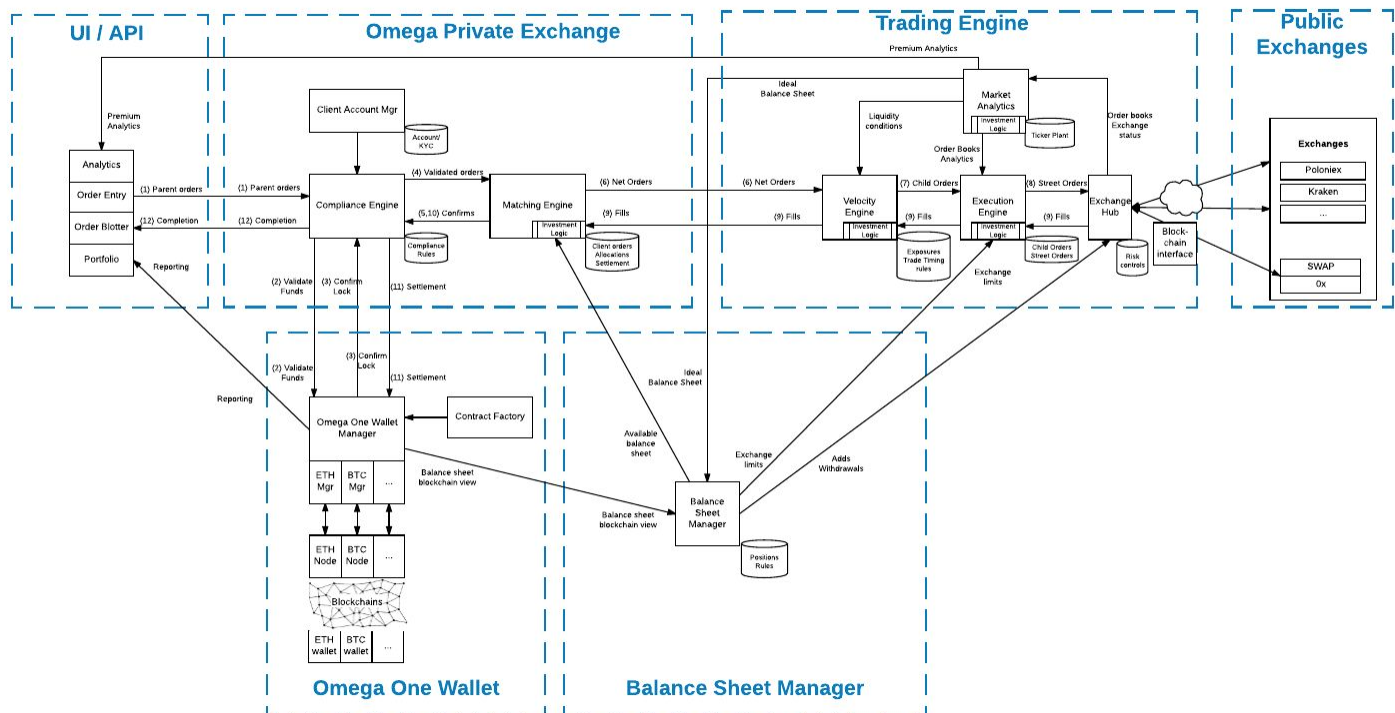The Balance Sheet Manager's job is to assess the current Omega balances - which will flow across assets based on the current open orders, and across exchanges based on where we happen to execute trades - and to rebalance funds across exchanges.

Detailed Architecture:

The high level architecture discussed above:
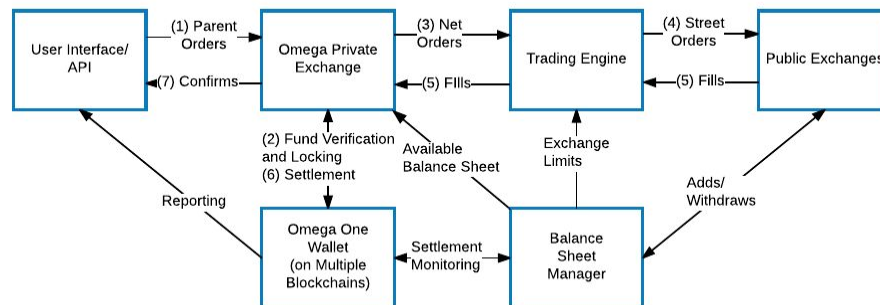
Expands out into the following detailed component architecture, as described on the following pages:

User Interface / API
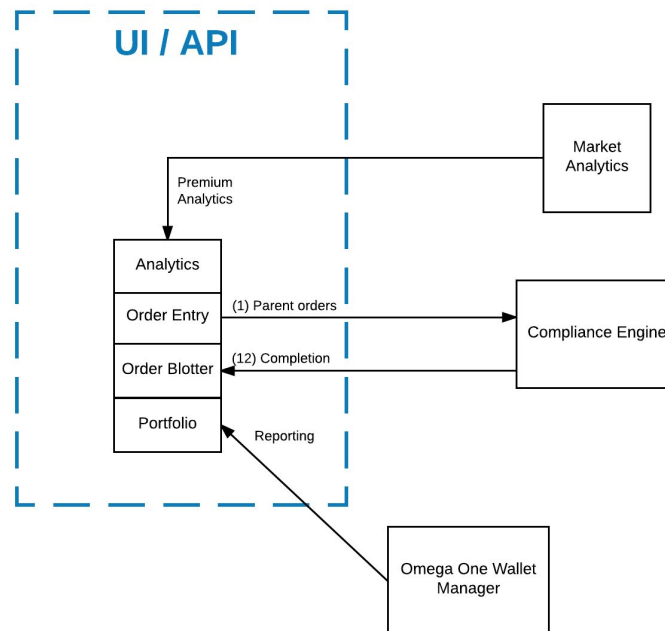
Order Entry	Create Order Creates a new Parent Order to place on the Omega One exchange. It is sent via the compliance engine for verification of funds on the blockchain.
Order Blotter	View Open Orders View the status of all orders open in the exchange Cancel Order Cancel an open parent order. If it has been partially filled, the filled amount will settle. View Trade History View the history of all your trades on Omega One
Analytics	Transaction cost analytics/Benchmarking Analyze the costs and cost savings from trading on Omega One Market/liquidity analytics (premium service) Dynamic analysis of liquidity and arbitrage opportunities across all crypto exchanges
Portfolio	Portfolio Management Services Reporting, valuations, crypto asset accounting, tax management Funding Add/withdraw funds (crypto and fiat)

Omega One Private Exchange

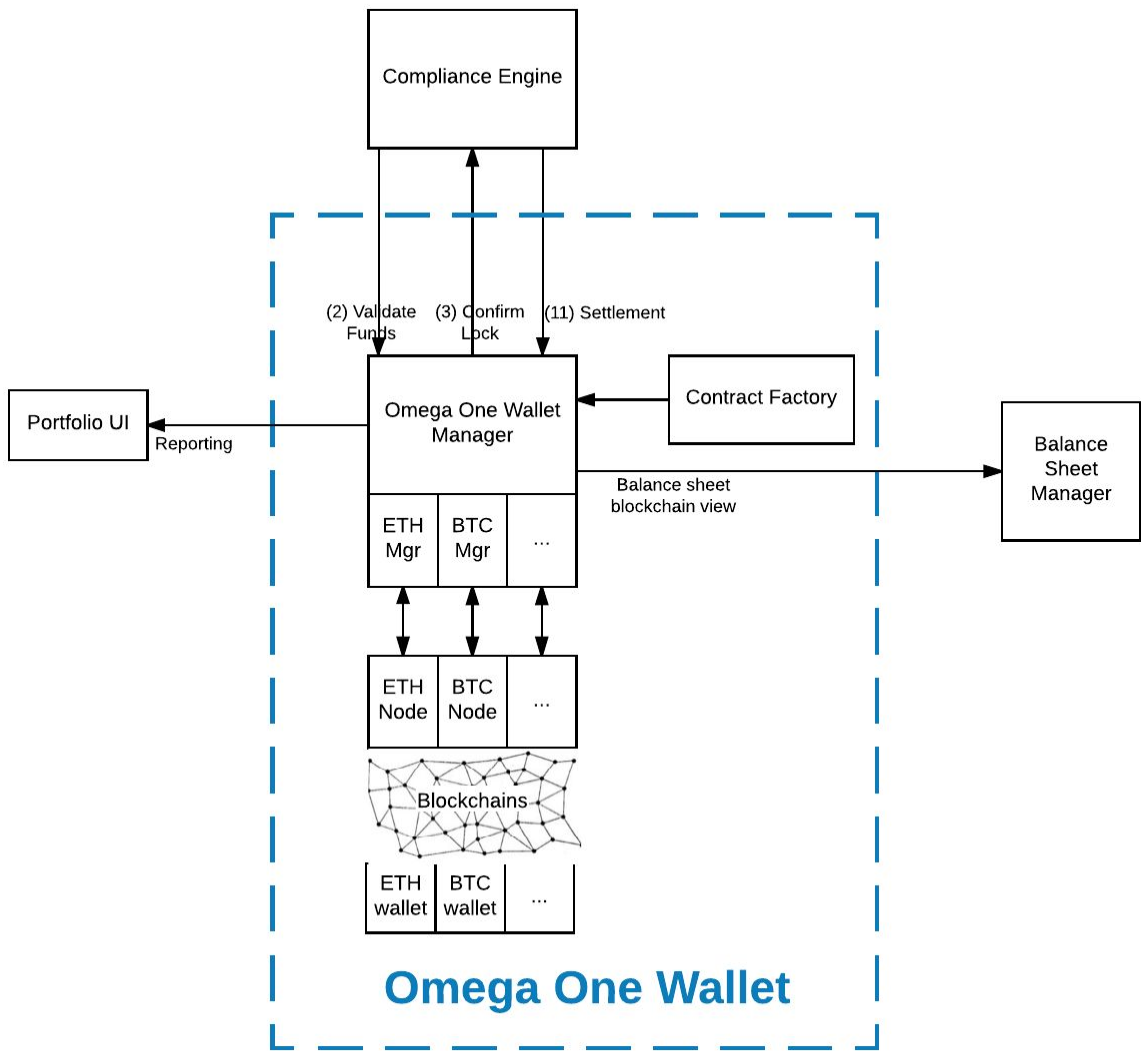| Compliance Engine	**Regulatory, KYC and account constraint checks** Ensures that the parent order is being sent from a valid and compliant account, and does not violate any constraints that account has set on trading. **Validate fund availability and request locks** Leverages the Omega One Wallet to check that funds are available to back the order, and lock those funds until order completion, allowing the order to be sent for matching. **Create Settlement Instructions** When confirms come back from the matching engine that an order has been completely filled, compliance check and then create settlement instructions for the Wallet Manager.
Matching Engine	**Match New Parent Orders** When a new parent order arrives on the exchange, it will first be matched against any existing parent orders in the other direction; any residual of the order will be added to the NetOrder managed by the Trading Engine. **Match Fills Coming Back From The Market** When the Trading Engine delivers back a filled Child Order, that fill is matched against all the open parent orders in the other direction. **Allocate Matches** When either a new order or a fill is matched against a large number of orders on the other side, each of those orders will only get partially filled. The rate at which any given order gets filled by the new liquidity arriving on the system is dependent on a number of factors including the member's Omega token balance - higher balances will be filled more quickly. The preferential allocation of liquidity to larger token balances is key to the crypto-economic value proposition of the Omega token (see

	[Token Model](#) below).
Client Account Manager	<u>KYC clients</u> Ensure that all accounts trading on Omega One are under good standing from a legal/KYC perspective. <u>Manage account parameters</u> Apply any trading constraints that any members have set up on their accounts.

Omega One Wallet

Omega One Wallet Manager (abstracted management layer sitting on top of specific implementations on each blockchain)	<u>Lock Funds</u> On presentation of a signed, validated order from the Compliance Engine (2), ensure and confirm that funds are "locked" in the member's Omega wallet on the appropriate blockchain, i.e. that a payment channel has been created between the relevant Omega wallet and the Omega One Wallet Manager, such that ownership of the existing asset may be removed from the member for a successful atomic swap of the desired asset, but set up so that funds revert to the Member in case of failure. <u>Withdraw Locked Funds</u> On presentation of proof of a valid atomic or completed swap (11) within the constraints of the order, allow the locked funds to be withdrawn.

	Remove Lock After funds have settled completely, remove any remaining lock placed on by that order.
ETH Mgr, BTC Mgr, etc., running on ETH node, BTC node, etc. (more blockchain managers to be added in future releases)	Manage Ethereum Blockchain Reads and writes to the Ethereum Network via a full Ethereum node, for the purpose of facilitating the trading of Ether, ERC20, and ERC223 tokens. Manage Bitcoin Blockchain Reads and writes to the Bitcoin Network via a full node for the purpose of facilitating the trading of Bitcoin and colored coins such as the Omni-based Tether.
Contract Factory	Instantiate wallets and escrow smart contracts Stores contract templates used to generate Omega Wallets and HTLCs used to escrow and transact tokens across Crypto-Network boundaries.

Trading Engine

Velocity Engine	Manage Trading Velocity
	The Velocity Engine takes the NetOrder (6) in each Pair.Direction and manages how fast it is traded (size/time). Trading velocity is non-linearly but highly and monotonically correlated with liquidity: the faster we trade the more frictional cost our members end up paying. But the slower we trade, the more volatility risk and signal decay our members have to contend with.
	The Velocity Engine optimizes between these costs using proprietary investment logic, decides on a target execution profile, and emits Child Orders (7), which provide execution targets over a small time Δt.
	Here and elsewhere where the diagram has the words "Investment Logic" in a box, these represent injectable trading rules, where we will invest heavily over time in algorithmic improvements.
	FIll Child Orders
	Based on the Street Order fills emitted by the Execution Engine, the Velocity Engine fills Child Orders and passes them up to the Matching Engine to match with Parent Orders.

Execution Engine	**Implement Trades** While the Velocity Engine is responsible for deciding how much size *s* of a given NetOrder should be traded in a given time *t*, the Execution Engine is responsible for trading that slice of the NetOrder most efficiently within that time. This will involve assessing the current liquidity across all exchanges (using analytics provided by the Market Analytics service), and placing orders as efficiently, anonymously and cheaply as possible on exchanges, using another set of proprietary investment logic.
Exchange Hub	**Interact With Exchanges** The Execution Engine and Balance Sheet Manager communicate with exchanges and other liquidity sources via the Exchange Hub, which translates requests into individual API implementations, and pushes state changes back to upstream components. The trading system will interface via APIs with all crypto exchanges, centralized and decentralized, where there is meaningful liquidity to harvest for our members.
Market Analytics	**Monitor Liquidity** Synthesize liquidity picture from market and historical data; calculate expected transactions costs by size, pair and direction; provide order book and liquidity data to Velocity and Execution Engines. **Calculate Ideal Balance Sheet** Given current liquidity and trading conditions, calculate what would be the ideal distribution of funds across exchanges to support it.

Balance Sheet Manager

Balance Sheet Manager	**Move Assets** Responsible for moving assets around between exchange accounts or other accounts on a given blockchain. **Get Ideal Balance Sheet** Market Analytics determines the ideal distribution of assets for our expected trading. **Get Current Cash Positions** Speaks to Wallet Manager and Exchange Hub to determine the cash position of the system in real-time. **Calculates Exchange Limits** Calculate how much we can trade on a given exchange based on our current balances and their expected settlement characteristics. **Add/withdraw exchange funds** Controls balances of assets on exchanges by sending messages to the Exchange Hub.

|	Move funds in and out of Vault
	Interfaces with cold storage solutions to safeguard the majority of the balance sheet when not in use.

Understanding Liquidity

Having outlined the technical solution and the flow of orders, this section explores the nature of liquidity costs and how to reduce them with liquidity aggregation and trading logic. This section is aimed at readers who are not experienced in liquidity dynamics; it uses highly stylized examples to demonstrate these points in a simple and intelligible way, and is not intended to be a direct description of the Omega One proprietary trading algorithms.

What are Liquidity Costs and Why Do They Matter?

Liquidity, put simply, is how easily and cheaply you can buy or sell an asset. An illiquid asset is something that is expensive or difficult to go through the process of buying and selling (like a house) and an illiquid exchange is an exchange where it is expensive or difficult to buy and sell things (generally because not enough people are buying and selling things on the exchange). When a market or a set of assets are illiquid, it creates a barrier to entry for potential investors and also reduces the efficiency of pricing.

When market liquidity is "deep", it is easy to buy and sell large amounts of an asset at or near the current market price because there are a lot of orders in the market willing to take the other side of the desired trade. Crypto markets, in general, are much less deep than traditional markets. Even trades in the low thousand dollar range can move some crypto pairs by a percent or more, incurring "liquidity costs" on every trade. Liquidity costs are the cost to the investor created by the impact that their buy or sell order in a market has on the price; they are in addition to and often orders of magnitude greater than exchange fees, but since they are embedded in the traded price they are often not visible or understood.

For example, let's say a trader goes to Exchange 1 to buy $1,000,000 of Asset A and there are only $100,000 dollars of Asset A offered at the initial price (P_i) on the order book. Below is a hypothetical example of the order book for Exchange 1. The X axis shows different price points with P_i, the initial price (or market price), being the most recent price at which a trade has cleared. The Y axis shows the depth of the order book with "bids" (blue) showing the total buy

Order Book Exchange 1
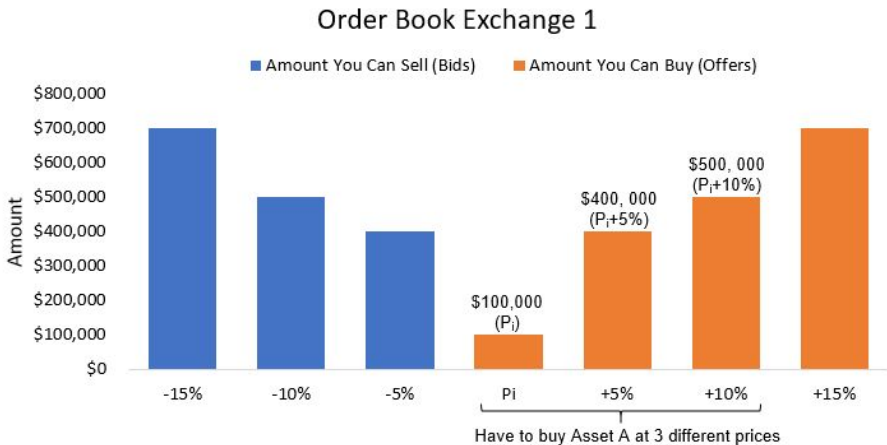
orders of exchange participants at different prices and "offers" (orange) showing the total sell orders of exchange participants at different prices.

To fill the order, the trader must buy all of the available Asset A at price P_i, then go buy up the next offer ($400,000 of Asset A at price $1.05P_i$), then the next offer ($500,000 of Asset A at price $1.10P_i$). Instead of paying the price P_i for $1,000,000 of Asset A, the trader has paid some other realized price P_R that is the weighted average of the different orders snatched up to purchase the desired amount of Asset A. The actual realized price is a weighted average of how much the trader had to buy at three different prices.

$$P_R = (\ \$100{,}000^*(P_i) + \$400{,}000^*(P_i + .05P_i) + \$500{,}000^*(P_i + .10P_i)\ )\ /\ \$1{,}000{,}000$$

This means said trader paid a realized price that is 7% higher than what they initially saw on the exchange (or, in other words, paid 7% of their trade in liquidity costs).

$$P_R = 1.07\ P_i$$

This would create a significant barrier to a trader's willingness to buy Asset A. They would have to have a 7% higher expected return to make buying worthwhile with the liquidity cost than without it, before even factoring in the liquidity cost they would incur again trying to exit the position in the future. If liquidity is similar on the bid side (how much people are willing to buy), the trader might end up paying another 7% to get out of the position in the future.

This example is not far off from the state of crypto liquidity today. Liquidity costs have ranged between 1-10% over the first half 2017 for a $1,000,000 trade on the most liquid crosses in the most liquid exchanges, and significantly higher for medium or low liquidity tokens and smaller exchanges. These crippling liquidity costs (compare to 0.01% liquidity cost at $1m in USD-EUR) keep large investors out of crypto exchanges. And many of those who do end up investing in crypto assets do it outside of the exchanges with OTC ("over the counter") brokers, who also often charge multiple percent for their services, and whose liquidity is even more fragmented from the mainstream of the market.

This is why liquidity costs matter. They create enough friction that they prevent capital from entering the exchanges and even, for those large investors unwilling to use low transparency OTC brokers, out of the crypto space altogether. Those who do engage in the exchanges either have to accept the costs of dealing in a low liquidity environment or implement clever trading logic on their own to minimize liquidity costs.

For a real-life look at the impact of liquidity costs in ETH-USD, see [Why The GDAX Ether Flash Crash Isn't Surprising](#), an explanation of the June 21, 2017 "flash crash" caused by a market order that was too large for the exchange liquidity book to absorb, with dramatic consequences for everybody on the exchange.

Components of a Liquidity Solution

Conceptually, liquidity costs (L) are a function of the size of the trade (s), the inverse of the available liquidity ($1/\lambda$) and the inverse of the intelligence of the logic with which the trades are implemented in the marketplace (1/i).

$$L = f(s, 1/\lambda, 1/i)$$

This means that there are only two ways to reduce liquidity costs for a trade of a given size: somehow increase the liquidity available or improve the intelligence of trading logic to reduce the liquidity cost. These are the two fundamental liquidity cost reduction services provided by Omega One.

> **Increased access to liquidity** through (1) liquidity aggregation across exchanges and (2) liquidity creation in the darkpool.

> **Increased trading intelligence** in the form of a layer of trading logic intermediating between members and markets to minimize price impact (through TWAP, VWAP, randomization and market game theory).

Below are stylized examples to demonstrate the basic mechanics underlying the liquidity cost impacts of liquidity aggregation, dark pool matching, and some basic trading logic.

Note: These are not intended to represent the relative impact of each liquidity-cost-reducing mechanism (as that will vary through time by order flow and market conditions), but to convey a basic understanding of the mechanics of liquidity cost reduction non-market experienced readers.

Liquidity Aggregation

The first and simplest way Omega One reduces liquidity costs is by aggregating liquidity across multiple exchanges. To build on the example used above in the [What are Liquidity Costs and Why Do They Matter?](#) section, let's imagine that the same order (buying $1,000,000 of Asset A) was executed immediately over two exchanges that each had the same market depth available on their respective order books. Now, there is a total of $200,000 available at price P_i ($100,000 on each of the two exchanges' order books) and $800,000 available at price 1.05 P_i ($400,000 on each of the two exchanges' order books).

Order Book Exchange 1

Half of trade on Exchange 1
$$P_R = (\$100{,}000*(MP) + \$400{,}000*(MP + 5\%)) / \$500{,}000$$

Order Book Exchange 2

Half of trade on Exchange 2
$$P_R = (\$100{,}000*(MP) + \$400{,}000*(MP + 5\%)) / \$500{,}000$$
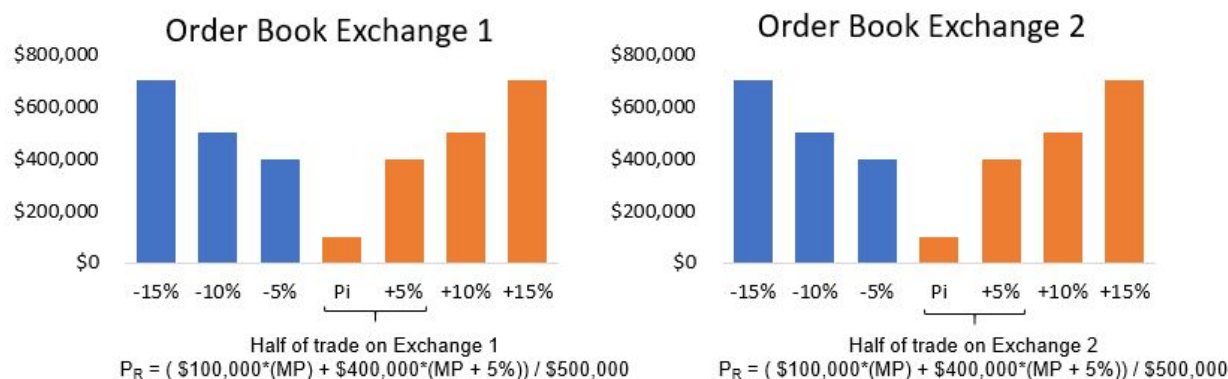
The realized prices of the purchases on the two exchanges needed to fill the $1,000,000 order are then as follows:

$$\text{Exchange 1 } P_R = (\$100{,}000*(P_i) + \$400{,}000*(P_i + .05P_i)) / \$500{,}000$$

$$\text{Exchange 2 } P_R = (\$100{,}000*(P_i) + \$400{,}000*(P_i + .05P_i)) / \$500{,}000$$

And the overall realized price of the order looks like this:

$$P_R = (\$200{,}000*(P_i) + \$800{,}000*(P_i + .05P_i)) / \$1{,}000{,}000$$

Because the buyer can fill more of the order closer to the current market price, the average realized price of execution is closer to the original price. Simply by combining the liquidity from two exchanges the liquidity cost has been cut nearly in half from 7% to 4% (creating a savings of $30,000 dollars in this case).

$$P_R = 1.04\, P_i$$

As the platform links to more exchange APIs, the benefit of trading on Omega One vs trading on any single given exchange continues to increase.

Liquidity Creation

At any given time, multiple members will be both buying and selling on the Omega platform. To continue building on the example above, another member might come and use the platform to sell $200,000 dollars of Asset A at the initial market price P_i while Omega One is in the process of executing the initial order to buy $1,000,000 of Asset A across two exchanges. This liquidity could be directly applied to the order that is being executed, and used to reduce the liquidity cost both of the initial member and the second member coming in on the other side of the trade. If we match those two orders, the realized cost of the initial member goes down again: $400,000 of the order can now be executed at the initial price, with only $600,000 having to move up to a higher price to find immediate execution.

$$P_R = (\$200{,}000*(P_i) + \underline{\$200{,}000*(P_i)} + \$\underline{6}00{,}000*(P_i + .05P_i)) / \$1{,}000{,}000$$

This would reduce the liquidity cost to the initial member by another 1% ($10,000) versus directly executing on a single exchange.

$$P_R = 1.03 \, P_i$$

On the other side, the presence of the initial (buy side) order also provided liquidity to the second (sell side) order and allowed it to be completed at P_i without taking liquidity from the exchange.

The implications of order matching within the platform are broader than a single example can illustrate. At any given time Omega platform has received either more buy or sell orders for a given cross, creating a "big side" and a "small side" of that market. If more people are using the platform to buy Asset A than to sell it, then a "buy Asset A" order is a big side order. The platform only needs to off-lay net big side orders into the aggregated exchange order books, while small side orders can be satisfied at the initial market price P_i by the liquidity sitting on the Omega One big side order book.[7] The presence of liquidity within the Omega platform creates a liquidity benefit to the Omega One members on top of the aggregated liquidity of the exchanges that Omega One operates across.

Trading Logic

In most cases, the most expensive way to execute a large trade on an exchange is all at once. Assuming that a single purchase hasn't changed everyone else's mind about what the "fair price" is, a single large move results in paying a higher price in a market that then reverts to the original price and incurs a loss.

A very simple form of trading logic is targeting the TWAP (time weighted average price) by spreading orders out over time.[8] To continue building on the example above and making some simplifying assumptions, let's say that P_i is also what the average price on the exchange would be over the next fifteen minutes and that liquidity enters each of the two exchanges on average in the form of $100,000 in sell orders at the current market price P_i every 5 minutes.

If this is true we can use very simple trading logic to execute the $1,000,000 with a simple TWAP. By spreading the order to two exchanges and using a $200,000 sell order that appeared in the Omega Private Exchange for the previous example we managed to execute $400,000 of the order quickly at P_i. If we wait for the additional $100,000 of sell orders to come onto each of the two exchanges and execute against them we don't have to move up to a higher price. Instead, we can complete the $1,000,000 "parent order" at 0% liquidity cost over 15 minutes by breaking it up into smaller "street orders" that mop up the new liquidity as it comes into the two markets.[9] Below is what the overall order completion would look like.

---

[7] This small-side order satisfaction will have to be obfuscated from the member perspective (meaning made to look more similar to a big-side order, with some randomization and spreading out of order execution) because if small-side execution were immediate, it would be possible for a malicious member to know what the big side of our order book is and front run us in the exchanges.

[8] It can help to think of this as using some of the liquidity that will exist in the future to lower your liquidity costs, rather than limiting yourself to the snapshot of liquidity available in the moment.

[9] Good trading logic minimizes how long it takes to execute a trade at the same time as minimizing liquidity costs. This prevents the more conceptual information decay cost of waiting to buy or sell, but in this simplified case we're putting that aside.

Time	Exchange 1	Exchange 2	Omega Private Exchange	%Complete	Realized Price
0	Buy $100,000	Buy $100,000	Buy $200,000	40%	$P_R - P_i = 0$
+5min	Buy $100,000	Buy $100,000	-	60%	$P_R - P_i = 0$
+10min	Buy $100,000	Buy $100,000	-	80%	$P_R - P_i = 0$
+15min	Buy $100,000	Buy $100,000	-	100%	$P_R - P_i = 0$

Each street order is executed at P_i such at that the overall parent order is executed at the market price that the buyer first saw when they entered the market.

$$P_R = P_i$$

While this is a grossly oversimplified example, it illustrates the power of breaking up orders and taking advantage of liquidity as it appears through time. To really do this effectively also involves learning exchange volume patterns to better approximate VWAP (volume weighted average price) and execute larger street orders at times when more liquidity is present on the exchange. On top of that, intelligent trade execution also has to factor in the reaction certain trades will get from other market participants (market game theory) and use partially randomized trades (in both direction and size) to make it difficult for other market participants to know that a large trade is being put into the market and to front run it.[10]

Combining this trading logic with the liquidity aggregation above can reduce liquidity costs to nearly zero for trades of the ~$1,000,000 size and create even larger benefits in absolute terms for larger trades. To review the aggregated impact of multiple layers of liquidity cost reduction from the stylized example, here is what liquidity costs were after each of those steps:

-Liquidity cost on the exchange for $1,000,000 order: **7% ($70,000)**

-With 2 exchange liquidity aggregation: **4% ($40,000)**

-With some dark pool order matching: **3% ($30,000)**

-With improved trading logic: **0% ($0)**

---

[10] This means driving up the price ahead of an incoming buy order or driving down the price ahead of an incoming sell order.

Token Model

Crypto-economic Design

The Omega One ecosystem is an open microeconomy in which Omega Tokens are held as proof of membership and exchanged for the service provided by the Omega One platform:
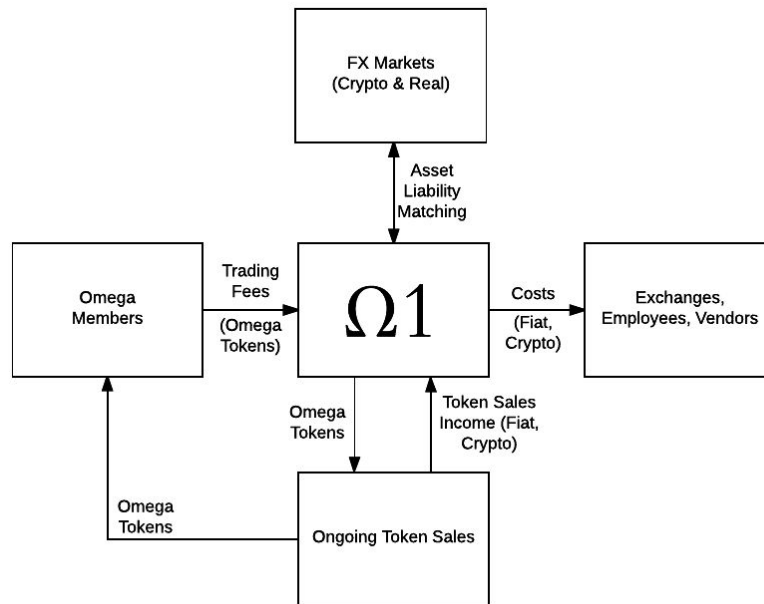
1. Some trading fees will be paid using Omega tokens, causing a constant upward pressure on the $\Omega 1$ token holding, and a downward pressure on market supply.

2. $\Omega 1$ counterbalances these two pressures by selling tokens, creating a downward pressure on its token holdings and an upward pressure on market supply.

3. Over time, token ownership will be decentralized through sales of $\Omega 1$'s token reserves, (see next section for details)

4. The velocity of Omega One's token sales will depend in part on the pace with which $\Omega 1$ sells its remaining token reserves: *Sales Velocity = Fee Velocity - Δ (Reserves) + Inflation*

5. $\Omega 1$ will aim to keep fees low and maximize the value of service provided to token holders, rather than extracting value from the system.

6. The currency breakdown of $\Omega 1$'s income will not necessarily match its costs, so it performs asset-liability matching trades with global crypto and FX markets.

Sales of Token Reserves

There is a considerable level of debate within the space on how to manage a supply of cryptocurrency reserves. On the one hand, the lack of a large central holder managing supply is one of Bitcoin's key features. On the other, the value provided by reserve management functions is sufficient that many recent token launches have included explicit reserve management commitments, and smart-contract based solutions are proliferating.

Our team's background includes expertise in monetary policy research, currency management systems, and macroeconomics. We view algorithmic reserve management policy as dangerous: compromised by inflexibility in the best case and gameable in the worst. When macroeconomics apply enough pressure to currency pegs, they invariably break. When this happens, it is the flexibility and intelligence of the policy makers that determines whether they impoverish themselves attempting to defend it or use reserves to smooth the adjustment to an appropriate price.

Therefore, in order to enable an orderly decentralization of OMT ownership over time without either causing price fluctuations or providing programmed sales that may provide a threat surface to attackers, Omega One will sell tokens according to policies and procedures that will be established.

Token Usage Benefits

1. **Membership**: To gain access to the platform, a member must have a minimum OMT balance. Higher balances will give access to premium levels of service

2. **Fee payment**: Trading fees can be paid with OMT, at a discount to normal rates

3. **Execution priority**: The size of a member's OMT holdings will impact their execution priority, resulting in faster execution and lower liquidity costs

4. **Discounted trading**: Large OMT balances provide further discounts to trading fees

Membership

The Omega platform will provide a set of services as described in the previous sections, including:
- Cryptocurrency Trading
- Portfolio management, reporting and analytics
- Tax and accounting features
- Transaction cost analytics and other trading data

These services will be offered on a tiered basis, with higher levels of service (Bronze, Silver, Gold, Platinum, etc.) available to members with higher OMT balances. In order to access these membership services, and the additional benefits listed below, tokens may be required to be locked up for a given duration.

Fee Payment

Every time a member uses the platform to trade between one asset and another, they will be charged a trade execution fee as a percentage of trade size. Members may choose to pay these fees out of their OMT balance instead of out of traded funds, in which case the fees will be discounted.

Fees are calculated as follows:
- The fee percentage is set by Omega One. It will differ by liquidity of the assets (e.g. BTC-ETH will have a lower fee than SNGL-ETH), as well as possibly by trade size and/or token holdings. As volume throughput of the platform increases over time, fees will likely go down as Omega One negotiates better terms with the exchanges to reduce the transaction fees that we pay in order to provide members with liquidity.
- The fee is assessed and collected at the time of order submission; if the trade is cancelled, the fee is retained.
- The user may pay trading fees using OMT, rather than in Sell Asset terms, at their discretion, either on a per-trade basis or as a user preference on all trades.

- The fee will be discounted when paid in OMT terms (using a market price for conversion), in order to incentivize members to hold OMT and use it to pay fees.
- If there is an insufficient balance of OMT in the user's wallet, this option is not available.

Execution Priority

The quality of execution on the Omega One platform (speed of order execution and liquidity costs paid) is dependent on the member's OMT balance (relative to the balances of other members who have outstanding orders in the same currency pair).

Orders on the Omega One platform are filled by a mix of orders that arrive on the other side of the book, and fills from exchanges and other execution venues generated by the trading engine. This incoming liquidity is distributed among all orders that are sitting on the platform, but it is not distributed equally; members with higher OMT balances will get their orders filled relatively more quickly, and will also be more likely to get filled by matching orders rather than orders from exchanges, with lower transactions costs.

We are also exploring mechanisms which would allow members to pay higher trading fees (i.e. using rather than holding Omega tokens) in order to get higher allocations on a given order.

Discounted Trading

To incentivize loyal use of the platform and accrual of usage tokens for future trading, Omega One trade execution costs are discounted for consistent and significant members. The level of discounting and the amount of daily trade volume that is subject to the discount are dependent on the member's OMT balance, and may also depend on the duration of any token locking function that is implemented.

NOTE: The services and benefits listed above will be built out on the Omega One platform over time; not all will be available in the first release of the platform.

Other Token Design Features

Seamless Purchase

If a member does not already have OMT to access membership, they can purchase OMT through the platform as part of their account setup, allowing for a more seamless entry into membership.

Interoperability

The token will be ERC20 compliant with the aim of being able to leverage the functionality of the Ethereum blockchain as much as possible and seamlessly interact with other ERC20 tokens and related smart contracts and DApps.

Inflation

Omega One will issue new tokens over time, at a low inflation rate that will be prescribed within the token smart contract. These tokens will be used to pay for improvements to investment logic or connectivity that can be demonstrated to increase the overall value of the liquidity services provided to token-holders by more than the inflation rate, thus actually having a net deflationary impact on token value.

Utility Token Usage

The Omega tokens are utility tokens whose entire value derives from the services provided by the Omega One platform in exchange for holding or consumption of the tokens, as detailed above. They are not intended for speculation and hold no claim to intellectual or other property or cash flows. They grant no right to participation in the company, and no claim in decision making over company assets or strategy. There is no promise of value beyond usage value, nor any claim on assets or revenue associated with OMT.

Token Launch And Use of Funds

Omega One needs to sell tokens to fund further platform development, hosting, integration, and other operational costs. However, our primary need for capital is not to cover such costs, but to build a large enough balance sheet that we can provide risk intermediation and settlement facilitation for a meaningful volume of daily trades. Because we need to be able to execute offsetting trades without taking custody of funds in order to intermediate risk, our trading limit (the volume of our service we are able to provide to our members) is proportional to the size of our balance sheet. (See Importance of Balance Sheet section below)

Our token launch will therefore be designed to optimize across the following goals:

- Ensure that we have all the funds that we need in order to release and operate v1.0 of the platform
- Grow our balance sheet in order to maximize the value of the service provided to our members, while reserving sufficient tokens for future balance sheet expansion as token values rise over time
- Ensure fairness and inclusion, to not to turn away orders or shut out small buyers, building a diverse pool of token-holders

The detailed token launch mechanism is being designed collaboratively with the marketplace, and will be published shortly in a future article. If you're interesting in helping to shape our thinking around the token launch (or any aspect of our design), please join our slack (linked on the last page of this document).

Below are the planned uses of funds in token launch:

Platform Balance Sheet: This will provide funds to float onto exchanges to be able to make offsetting trades for parent orders. As described above, this is required for trust intermediation with the public exchanges and for settlement intermediation on the private exchange. By and large, our ability to handle trading volume is proportional to the size of our balance sheet, so our need for balance sheet capital is uncapped; if our token sale is sufficiently successful to cover expected operational and legal costs, the majority of the remaining sales income will go to build our balance sheet.

Operation Expenses Including Staff: This includes basic operational costs such as office space, equipment, employee salaries and benefits and security measures for funds.

Legal: Legal costs include but are not limited to pursuing and attaining required licensing for expansion into different states and countries and legal analysis to ensure we are adhering to any and all regulatory requirements.

Foundation: A portion of our token launch will be allocated to seed a cryptocurrency based charitable and impact investing foundation with advisors from the traditional finance space as well as the crypto space with the goal of having leaders direct capital to projects that

maximize social impact and shape the crypto space to create good societal outcomes. More details of the Foundation will be provided in a future article.

Importance of Balance Sheet

A key component of Omega One's capacity to provide this value to its members is the balance sheet that we use to perform trust intermediation and allow members to keep funds in their own custody on blockchains.

The balance sheet is required for two key reasons:

1. To allow us to build up positions with which to fill our members' orders. Ideally, we only settle with a member at the end of a trade, when their order is completely filled. This (a) reduces transaction costs on the blockchain and (b) maintains privacy of the order during its life.
2. To intermediate in the settlement process, allowing the member to experience an instantaneous (atomic) swap of funds, shielding them from the actual movement of funds in any given trade, which is very much non-instantaneous, as it involves reaching transaction finality across blockchains, between the clients and the $\Omega 1$ wallets, and between $\Omega 1$ and the exchanges.

For the first reason, in order to provide optimal service, we intend to hold balance sheet in each currency equivalent to the expected total size of net open orders. If we hold less balance sheet than this, we will need to settle large orders in multiple small chunks, increasing transaction costs. Note that this may be an acceptable outcome in peak volume situations, preferable to rejecting trades.

For settlement intermediation, we need to hold additional balance sheet for all orders in the settlement process, covering the roundtrip time for Omega One to reach settlement finality with the member and to rebalance exchange positions. This roundtrip time is volatile due to network delays, and so $\Omega 1$ needs to have sufficient balance sheet to handle a 90th percentile network delay, and in cases where this is not possible, will need to take settlement finality risk.

Platform Development Status and Path

Current State (August 2017)

- The trading engine is in the process of integration with several exchanges.
- Omega token and launch contract are under development.
- The Omega wallet and multi-chain integration are in design phase and will be moving into development in July.
- We will announce when we are ready to release smart contract code for public review and bug bounty, after it has been through both ConsenSys and 3rd party security audit and due diligence.

Release 1.0 (~Q1 2018)

- Non-custodial smart contract wallets
- 2-5 exchanges
- BTC, ETH and the most popular ERC20 tokens
- First version of execution logic

Release 1.0 of the platform will use a quasi trustless smart contract model and will be limited to ETH, ERC-20 tokens, and BTC[11], with APIs to only the most liquid exchanges. Trading logic will be sufficient to harvest low-hanging liquidity, but will be focused mostly on timing and sizing of street orders rather than on complex resting order strategies. [The state of liquidity is such that even such a minimal product should have a significant impact on liquidity costs.]

Release 1.1-1.x (~Q4 2018)

- Integration more exchanges
- More currencies and tokens
- Analytics services
- Fiat currencies (custodial)
- Improved logic

With additional crypto crosses and exchanges having been added, the most meaningful new additions of Phase II will be the addition of fiat currencies (allowing us to bridge the fiat/crypto membrane) and analytics services to members. The barrier to inclusion of fiat in the MVP is both legal and technical, and a significant portion of the legal bucket of capital from the token launch will go toward ensuring that this is done in compliance and cooperation with regulators. On the analytics side, a central source recording meaningful data and interacting

---

[11] Developing the "smart contract" functionality to manage locking and atomic swaps on the Bitcoin blockchain is significantly harder than on the Ethereum blockchain, so we may end up restricting BTC scope to custody (i.e. you have to send us BTC to trade) or removing it from Release 1.0 altogether.

24/7 with crypto exchanges will go a long way toward filling the data gap in the crypto markets and getting analysts, entrepreneurs, and traders the data they need to continue innovating in these new markets.

Release 2.0 (~Q4 2019)

- End to end trustless liquidity available
- Self-improving/decentralized logic engine
- Continued expansion across liquidity sources and assets

This release relies on technical development in the broader crypto ecosystem including improvement in the efficiency of double-blinding smart contracts, and the movement of liquidity to reliable, fully decentralized exchanges. In this case, completely non-custodial and trustless liquidity would be able to pass through the Omega platform and be optimally allocated across exchanges, without any information leakage or front-running due to on-chain transparency.

On top of that, this version of Omega One would have a self improving AI trading logic engine, that also receives improvements from the community of members and allocates Omega tokens collected as fees back to members who had a meaningful impact on improving trading logic. At this stage the Omega platform would be a fully decentralized, community owned and run public utility that improves the efficiency and liquidity of crypto markets for the betterment of the space.

Regulatory Compliance

Given the scale and importance of Omega, the Omega team is working to ensure that the platform is in complete compliance with regulatory and legal requirements and licenses to conduct money transmission services. We are working with experienced lawyers to meet legal and regulatory requirements. Especially in services that interact directly with markets, variation in legal requirements by jurisdiction mean that the platform will take measures to limit its services to jurisdictions in which we can legally operate. For the good of the development of the crypto space, we hold compliance and openness toward regulators as the utmost priority and wish to be a model for other services in the space. We expect and welcome engagement and cooperation with regulators in the future.

How To Participate in Omega One

The best - perhaps only - way for protocols and platforms to succeed in this new decentralized financial system is to build a community around them, and Omega One is no exception to this rule. We invite engagement and dialog on our business model, our token model, and our design. We view our role in the markets as providing a service for the benefit of the emerging financial system and we need public involvement to fulfill that mission.

Please join our slack to give us feedback on the whitepaper.

To become a part of our community, or just to find out more about Omega One, you can:
- Visit our website at http://omega.one
- Join our public slack at https://join.slack.com/omegaoneproject
- Follow us on Medium at https://medium.com/@omega.one
- Follow us on ConsenSys Media at https://media.consensys.net/@omega.one
- Follow us on Twitter at https://twitter.com/omegaoneproject
- Follow us on Facebook at https://www.facebook.com/OmegaOneProject/
- Or simply email us at contact@omega.one