Oxygen: The Prime Brokerage Protocol

White Paper

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Public equity trading is in a golden age. Apps like Robinhood, Revolut, eToro and Public have democratized investing for the masses; today, an investor can take out their phone and buy shares of publicly listed companies in seconds. This trend has created trillions of dollars of volume, certified the next generation of unicorns, and, in many ways, defined 2020.

Compare this to a few decades ago, when buying stocks meant driving to a brick-and-mortar stock brokerage, talking with your financial advisor, arranging instructions, and waiting days for those to be processed, all with unknown and often egregious fees.

What changed? How did we get here from there?

The key, really, was technology. As trades migrated from paper to the internet, the cost of trading went down. Without the need for multiple people to be involved in manually processing each transaction, trades started whizzing by, each recorded and settled automatically. At the same time, a combination of API feeds and ubiquity of smartphones meant that everyone could stream market data, send back an order execution instruction, and receive a fill, in seconds.

While some of these APIs existed even in the 1990s, the financial and regulatory costs of using them fell drastically over the subsequent three decades to near zero. Even until last year for a single trade on some major platforms like Fidelity and Schwab could cost retail customers up to $5, effectively pricing out much of the market. But now that cost is near $0, and usage has skyrocketed.

The same can't be said of more complex products. Prime brokerages, facilitators of trading and leverage for institutional clients and hedge funds, act as gatekeepers to most of the space. The manual, bespoke effort going into building and maintaining those relationships means that only large institutions have access to most of the world's structured products and margined services.

Decentralized Finance (DeFi) is a movement to replicate the financial constructs of traditional finance without a centralized organization controlling them, allowing anyone with a smartphone and an internet connection to have access. The blockchain is in some ways an open and permissionless model for an API feed, allowing anyone with a Web 3.0 wallet to access data freely and execute transactions. Different protocols in DeFi hint at what borrow/lending desks, pools, exchanges, and structured products could look like if they were open and scalable.

The fees paid to middlemen and investment banks get replaced by blockchain and protocol fees, and the API feeds are free. And just this year, we've seen an explosion in DeFi protocols, predominantly built on Ethereum. There is more than $14.4B in total value locked in DeFi at the moment. DeFi borrow-lending

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protocols like Aave and Compound have over $3B in total assets under management, and have grown 20x since the summer[1].

But we're in the early and expensive days of DeFi protocols: the old Schwab model, rather than Robinhood. On Ethereum, each transaction can cost upwards of a few dollars[2], the blockchain has a maximum capacity of 15 transactions per second. That's a lot better than having to drive to a physical brokerage, but a far cry from commission free trading at the click of a button.

However, reduction in cost and increase in capacity is happening in the broader blockchain industry. On Solana, a blazingly fast public blockchain, transaction costs is closer to $0.00001, and the blockchain can support up to 50,000 transactions per second, with a block time of 400 milliseconds[3]. At that scale, Solana can process the transactions of a mass audience for essentially no fixed cost: exactly what's needed to power an industry.

But being cheap and fast isn't enough – you also need customers. The current userbase on the Solana blockchain is small, but by Robinhood's scale so is all of DeFi. Indeed, all of DeFi combined has less than 1 million lifetime users.

In order for a marketplace based DeFi protocol to achieve huge success, it would need to master four core components: (1) solve a pressing need (2) with a well-designed protocol (3) built on scalable technology (4) with a massive userbase.

Introducing Oxygen: an on-chain prime brokerage built on the liquid and growing Serum ecosystem, running on Solana's scalable blockchain, and seeded by the 140M users of the Maps.me 2.0, an on-chain mapping and fintech application.[4]

1 Oxygen Protocol: Pool-based financial infrastructure starting with a borrow/lending protocol

Prime brokerage is a core building block for financial markets. It connects various market participants - hedge funds, institutions, pension funds, insurance companies, asset managers and liquidity providers - contributing towards market efficiency and price discovery, as well as facilitating leveraged trading and asset lending. It is estimated that the revenues of the prime brokerage industry

[1] $1.7B in Compound. $1.7B in Aave
[2] https://ycharts.com/indicators/ethereum_average_transaction_fee
[3] https://solana.com/
[4] https://docsend.com/view/fe3s3gusb84w7a2a

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will surpass $30B[5] in 2020 and over $4.2T[6] of securities have been lent and borrowed between Q1-Q3 in 2020 by US Banks.

Prime brokerages are only accessible to larger financial institutions with assets exceeding hundreds of millions of dollars. This exclusivity is not by design but reflects an economic reality: the costs of coordination, risk management and human capital incurred while providing these financial primitives have historically made it prohibitive to serve anyone other than the ultra-wealthy. In fact, like most marketplaces, prime brokerage[7] themselves benefit when additional institutions onboard.

Oxygen Protocol is starting by building a prime brokerage designed to cater to the needs of DeFi applications and users. Oxygen is built around Pools[8], baskets of assets that take collective actions. By having a permissionless, cheap, and scalable prime brokerage protocol, Oxygen will democratize borrow/lending and make it more efficient for all participants. We expect to address the following use cases directly:

1. Yield generation: users can deposit funds and earn yield on their assets.
2. Borrowing: users can borrow assets from a pool, paying interest to the pool
3. Trading: users can trade directly out of the pool, allowing for collective action and efficient capital usage
4. Synthetic Products: trade more complex products using their pool's assets as collateral

Following the Prime brokerage protocol, we plan to create volatility trading protocols and structured product constructors to enable people to create their own structured products for themselves and for their clients - all on-chain.

The borrow/lending protocol is just the beginning. Our vision is to recreate marketplace-esque business units which exist within investment banks and make them accessible to everyone.

1.1 Oxygen Protocol: Secure, On-Chain Protocol Designed for Capital Efficiency

Prime brokerage desks within investment banks intermediate most market-trading activities for hedge funds and institutional investors. They hold the

[5] https://www.thetradenews.com/prime-brokerage-revenues-top-30-billion-2020-report-shows-banks-can-capitalise/

[6] http://bankregdata.com/allOBmet.asp?met=SLB

[7] They take upto 80% of the fee paid by hedge funds for borrowing assets and only 20% is given to the lender.

[8] Pools (Portfolios) are generalized primitive whereby the account can hold assets, allow for creations (redemptions) based on inflows (outflows) and trade as a unit.

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power to change rules arbitrarily, like pulling financing or significantly increasing margin requirements. They often charge a hefty intermediation fee to connect demand and supply. For example, in stock lending, pension funds often get 20% of the stock loan rate that hedge funds pay to borrow the pension fund stocks, with the prime broker taking the remaining 80% cut. This market is massive yet opaque with almost 10% of all equities available to borrow, yielding over $30B annually for these investment banks.

In DeFi, these services are provided via smart contracts, "code is law"[9]. Oxygen protocol is decentralized, non-custodial, and fully on-chain. All transactions are purely peer-to-peer with no involvement from a centralized operator. Oxygen protocol never has access to users' private keys. All the transactions are auditable, immutable, and final. The clearing price for borrowing / lending is determined by the market - through on-chain order-book matching using Serum DEXes. Finally, the risk management and liquidation systems are completely on-chain. The Oxygen Protocol will be verifiably transparent and deterministic.

Moreover, the borrow-lending protocol on Oxygen has been carefully designed with the primary goal of capital efficiency, so that our users can get more out of their money while also being more secure than in traditional finance.

Capital Efficiency

1. **Multiple use of the same collateral** - Lending enables you to generate yield on your portfolio, while borrowing other assets at the same time. Cross-collateralization - With Oxygen, you can utilize all of your portfolio as collateral when you want to borrow other assets. This should mean lower liquidation risk for your portfolio.

2. **Market-based pricing** - Oxygen protocol is order-book based, rather than following a pre-set market model that requires manual adjustment. This means you get the fair price for borrowing/lending every time.

3. **In-pool trading** - rather than forcing you to continually deposit and withdraw from your account, Oxygen will allow users to interact with the Serum ecosystem and DEXes directly from their pools, streamlining the process.

4. **Sophisticated products** - because Oxygen uses a general on-chain risk-management engine evaluating each user's pool rather than a fixed borrow/lending model, it is built to support arbitrary products: tokens, synthetic products, nonlinear assets, and more; all cross-margined in the same account.

[9] And it is not to say that decentralized finance platforms haven't had their fair share of issues and unexpected behavior. Most decentralized finance platforms bottom out at some centralized price oracle, often the key source of vulnerability.

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Risk Management and Liquidation on Oxygen

From a user's perspective, the Oxygen protocol is very similar to other borrow/lending protocols. The user creates a pool and deposits their assets, marking the assets that can be lent out and the corresponding terms. When a match is successful, i.e.-there is a borrower willing to pay the specified interest rate, the assets are lent out and the lending user receives passive income. They can use the pool to borrow different assets if needed[10]. The borrows (loans) can be closed at any time by paying (receiving) back the borrowed assets.

Risk model

However, as the prices of the underlying assets vary, the value of the loans and borrow also vary. Therefore, we require a liquidation and risk management engine that can make sure that all loans are solvent and backed. In the beta version[11] of Oxygen protocol we will use the following risk and liquidation mechanics:

1. The pool can increase leverage as long as Pool LTV $<$ Initial LTV.
2. When the Pool LTV $>$ Maintenance LTV:
    - The Pool LTV needs to be restored to Reset LTV within a certain timeframe ("margin call timing") through putting in more assets or deleveraging.
    - If the pool does not receive the expected additional collateral or otherwise deleverage before the end of the margin call period, the pool is in default and can enter into liquidation.
3. If at any time Pool LTV $>$ Critical LTV:
    - The pool can immediately go into liquidation if any user initiates it.

[10] In particular, you can borrow upto: Initial Loan-To-Value for the pool (%) * Value of the pool (USDc)

[11] We expect the parameters, data source and other constants to be either updated via governance proposals or dynamically based on market conditions and concentration limits. These include parameters such as:

- Initial, Maintenance, Critical and Reset LTVs for a given asset in a normalised environment
- Adjustments to Initial, Maintenance, Critical, Reset LTVs in different volatility / liquidity regimes
- Adjustments to LTVs for asset concentration / diversification
- margin-call timing - The time to allow pool owner to bring pool LTV to reset LTV
- Liquidation strategy and models

In the alpha version the initial LTV = Reset LTV and Critical LTV = Maintenance LTV (implicitly, margin-call timing = 0). In the beta version, we'd expect Initial $\leq$ Reset $<$ Maintenance $<$ Critical LTV and the exposition refers to this case.

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Liquidation Model

Once the liquidation is triggered by an initiator, the liquidation price for the pool assets is fixed. The following happens:

1. Liquidation Initiator has 1 minute exclusivity after the change of state of the pool into Liquidation State to buy pool assets (proportionately) at a discount (based on Liquidation discount table which will be ¡ 1.0) in exchange for one or several tokens that the pool owes.

2. After the first minute, any Liquidator can buy assets in the portfolio at the Liquidation Discount in exchange for one or several tokens that the pool owes.

For technical specification, and risk/liquidation mechanism please see documentation at: https://www.oxygen.org/docs-intro.html#risk-management[12].

Security

We take security very seriously, regardless of the fact that the protocol is non-custodial. The history of DeFi is littered with unaudited projects having subtle bugs which lock out user funds or are hacked[13]. We are working with two of the top 4 auditing firms globally to ensure protocol security. Moreover, we have a team of security experts reviewing and assessing the different threat vectors.

Alpha GUI

Finally, along with a well-designed protocol, we need to have a suitable UI and supporting documentation that allows others to visualize and build on the Oxygen protocol. Earlier in December we launched an alpha UI to allow our users to create and invest via their own pools. It can be found at https://app.oxygen.org/. We expect the Oxygen community to develop UI interfaces that end up becoming the primary interface to the Oxygen protocol, onboarding millions of users.

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2 Oxygen Protocol: Built on fast and scalable blockchain

US exchanges like NYSE, CME and CBOE can handle hundreds of thousands of transactions per second and have a matching latency in the microseconds. This is orders of magnitude faster than current blockchains. In particular, Ethereum

[12] In the beta version, the protocol would be able execute liquidation orders via the dex directly.

[13] A couple of examples from the last two months include (1) Harvest Finance being hacked for $24 million (2) a hacker draining $19.1M DAI from Pickle Finance

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1.0 can process 15 transactions per second[14], has an inter-block time of 15 seconds[15] and transactions often cost more than $1 each[16].

A widely adopted, completely on-chain, peer to peer borrow-lending protocol would need to have comparable transaction throughput from an underlying blockchain in order to scale. Oxygen protocol is built on Solana, a blazingly fast public blockchain which can support over 50,000 transactions per second, has block times of 400 milliseconds and a transaction cost of roughly $0.00001. And Solana will scale with Moore's law via parallelism, with a foreseeable roadmap to 1 million transactions per second and 150ms block times. With this capacity, it would theoretically be able to support the activity on Visa, Mastercard and all the US-based exchanges combined.

Serum is a vibrant DeFi ecosystem built on Solana, supported by Alameda Research and other large liquidity providers. As a consequence, the on-chain decentralized exchange (dex) on Serum is liquid and efficient. In the alpha version, the Oxygen Protocol relies on the Serum dex prices for order execution, market data, pricing, and risk management. Any ERC20 can be wrapped as a Solana Program Library[17] token, thereby being supported on the Serum dex and Oxygen protocol.

And the composability of decentralized finance flows both ways. As Oxygen protocol leverages the Serum based DEXes, other projects interested in integrating or expanding Oxygen's functionality can compose seamlessly without any required coordination or permissions.

3 Oxygen Protocol: Seeded with 140M users of Maps.me

Even the best marketplace based protocol, built to scale, is useless unless it has a vibrant userbase. And most DeFi protocols haven't attracted the end users. The most active DeFi protocols in the world currently have about 250,000 unique ethereum addresses who've ever used it [18]. This is a fraction of the user base of equivalent traditional finance apps[19].

Maps.me is the world's leading offline mapping application. Over the last nine years, Maps.me has been trusted by 140M users, with over 60M people using Maps.me annually last year to navigate across 195 countries. Maps.me

[14] https://blockchair.com/ethereum/charts/transactions-per-second

[15] https://etherscan.io/chart/blocktime

[16] https://ycharts.com/indicators/ethereum_average_transaction_fee. Eth2, a multi-year project will scale the transactions per second to 1000s of transactions per second.

[17] https://spl.solana.com

[18] https://www.coindesk.com/uniswap-uni-distribution-growth-token-defi-strategy

[19] Robinhood (13M users), Coinbase (35M users), Revolut (12M users) and Transferwise (6M users) all have significantly smaller userbases

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2.0 is a technological revamp of the application integrating financial applications to an online mapping platform for the large user base. It will likely be one of the largest fintech applications, with 8x the number of users of Robinhood and 100x as many users as all of DeFi combined.

And these services will be built on the Oxygen Protocol. This partnership is likely to bring tens of millions of users to the Oxygen Protocol, borrowing and lending assets, trading, investing and managing their financial lives.

4 OXY Token

The OXY token will power the Oxygen Protocol, governing it and 100% of its net revenues[20].

Protocol and network fees

The Oxygen protocol is likely to charge a fraction of the the yield earned by the lenders. All of those fees will be governed by OXY token holders[21].

Protocol governance

The Oxygen Protocol is driven by the OXY token holders. Each token represents one vote and the token holders will vote on binding governance initiatives related to Oxygen Protocol.

Preliminary details on the governance model and distribution may be found in the appendix.

5 Team and Advisors

Alex Grebnev, CFA, Co-Founder

Alex has over 16 years of investment banking (Managing Director at Merrill Lynch, Goldman Sachs) and fintech experience. He has an MA in mathematics from the University of Cambridge.
LinkedIn

Viktor Mangazeev, Co-Founder

Viktor is a serial technology entrepreneur. He was the CEO and co-founder of myDFS, a daily mobile fantasy sports platform called uTrener and a white-label

[20] 100% of net-revenue of Oxygen Protocol platform should be applied to the benefit of the Oxygen network through buybacks and cancellation of OXY or otherwise. Amount, timing and existence of such buybacks is not guaranteed and may depend on a number of factors.

[21] to direct to e.g. buy and burns, yield, grants, insurance funds, etc., as OXY token holders dictate

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app for KHL, Eastern Europe's biggest hockey league. He also worked as CIO for a number of large companies. Viktor studied at Moscow's National Research Nuclear University MEPhI.
Linkedin

Sam Bankman-Fried, Advisor

Before founding Alameda and then FTX, Sam was a trader on Jane Street Capital's international ETF desk. He traded a variety of ETFs, futures, currencies, and equities, and designed their automated OTC trading system. He graduated from MIT with a degree in physics.
Twitter, LinkedIn

Adrian Ciaffoncini, Advisor

Adrian brings over 7 years of experience in financial services, having worked at one of Australia's largest banks and more recently for Morningstar's asset management business.
LinkedIn

6 Additional Information

You can find additional information at https://oxygen.org. The team can also be contacted directly at sales@oxygen.org.

7 Appendix

7.1 Proposed Governance Model

Oxygen Protocol will include a simple governance model based on the OXY token. 1 OXY = 1 vote. Anyone can propose a governance action for $1,000 of OXY token, with the initial governance scheme proposed below. If a proposal is voted through, the OXY will be returned back to the proposer. Governance actions can potentially include the following types of proposal:

- Economics and fees of Oxygen Protocol
- Changing the risk management, liquidation, data sources and other governance properties
- Deciding on assets available on the platform for lending / borrowing

All proposals are subject to a [3] day voting period, and any address with voting power can vote for or against the proposal. If a majority, and at least 1B votes are cast *for* the proposal, it will be implemented after [2] days.

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Voting and governance may be implemented using aggregation through Nodes. This would be a decentralized structure through which stakers could provide additional utility to the protocol.

This is only an outline and the exact procedure for implementing the governance process will be determined at a later date.

Locked OXY tokens will be eligible for most rewards, including yield, staking and governance.

7.2 Token Distribution

The initial distribution of OXY is as follows:

Category	Number of Tokens	% Allocation	Unlocked*
Community Fund	2,000,000,000	20.0%	0%
Team	1,000,000,000	10.0%	0%
Serum Ecosystem Incentives	1,500,000,000	15.0%	1.5%
Maps Ecosystem Incentives	1,000,000,000	10.0%	0%
Product and Tech Growth	2,500,000,000	25.0%	8.5%
Private Sale	1,000,000,000	10.0%	0%
IEO	200,000,000	2.0%	2%
Partners	800,000,000	8.0%	0%
Total	**10,000,000,000**	**100%**	**12.0%**

* Locked tokens are fully locked for the first year. They will unlock linearly over the five years starting in December 2021.

The amounts mentioned above are estimates and may change over time.

Liquidity. OXY is expected to be listed on Serum, FTX and other top exchanges. Multiple top trading firms have committed to provide liquidity for the token.

Giving. 35% of all tokens are allocated to the Oxygen and Serum communities. MAPS and SRM token holders will provide input on how to best develop the ecosystem using the funds in their Community Funds.

Lockup Commitment. 88% of all tokens, including all private sale tokens, are locked up over six years. This means that the team, partners, and investors are all committed to the long term success of the Oxygen protocol.

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