DECENTRALISED FINANCE IS THE FUTURE

SWAP and Decentralised Exchanges, OTC, In House & P2P Loans, Staking and Stablecoins!
Abstract

The SwapDex Protocol allows users to generate USDX by leveraging collateral assets approved by “SwapDex Governance.” SwapDex Governance is a community that organizes and operates the process of managing the various aspects of the SwapDex Protocol. USDX is a decentralized, unbiased, collateral-backed cryptocurrency soft-pegged to the US Dollar. Resistant to hyperinflation due to its low volatility, USDX offers economic freedom and opportunity to anyone.

This white paper is a reader-friendly description of the Protocol, which is built on the Ethereum blockchain. Technically savvy users might want to head directly to Introduction to the SwapDex Protocol in the SwapDex Documentation Portal for an in-depth explanation of the entire system.
Introduction

Blockchains have been revolutionary by allowing anyone to own and transfer assets across an open financial network without the need for a trusted third party. Decentralized Finance or DeFi is the latest development in the industry. DeFi is used to describe the cluster of applications offering financial services based on decentralization. The concept of decentralization stands in contrast with the traditional financial services that are generally centralized.

The decentralization of financial services can be achieved through smart contracts where rules are embedded and enforced automatically. All the data about transactions are stored in the distributed ledger. This way, no actor has complete control over transactions, thus preventing censorship or corruption. As such, Decentralized Finance (DeFi) is the movement that leverages decentralized networks to transform old financial products into trust-less and transparent protocols that run without intermediaries.

With DeFi, core traditional financial use cases like stablecoins issuance, lending/borrowing, trading, peer-to-peer payments, and portfolio management are carried out on the blockchain via Decentralized Applications (DApps) or protocols. These create a peer-to-peer financial network, the majority of which are currently built on Ethereum.

According to Dune Analytics, the number of DeFi users in August 2020 is following an exponential trend. It has surpassed 250 000, which is a five-fold increase compared to a year ago. Swap, wallet to wallet trading, staking, stable coin issuance, and peer to peer lending represent the most significant share of the DeFi market to date. Offering market participants, the luxury of diversifying their financial investment and earning handsome returns on every one of their investments.
This paper introduces the all-in-one DeFi Platform without the flaws of existing approaches that enable proper money markets to function and create a safe positive-yield approach to financial assets. Swapdex DeFi brings all the latest decentralized products into one place and will be governed by the SDX token. We understand that there is a need to end the notoriously vague and abysmal trends in traditional finance. With Swapdex, all these will be improved upon to our users' gains and the decentralized finance market as a whole.

Swapdex will consist of two decentralized exchanges, SWAP, and DEX, giving the newest users ease of access to cryptocurrencies along with tools for the seasoned traders straight traded from your wallet, staking for generated profits along with loaning systems, stablecoin USDX, Fiat gateways, and further ahead of many other DeFi products built on the SDX token ecosystem such as decentralized betting and NFT's, investment opportunities and many real-world financial products. Our unique decentralized ecosystem is like no other in the market. This gives us an edge in these early stages of decentralized finance.
Mission

The mission of SwapDex is to provide an ethereum blockchain-backed all in one platform for all decentralized finance products. With this, wallet-to-wallet trading and swap that gives users the choice of becoming a taker, maker, and a liquidity provider can be carried out. In-house and peer to peer loan marketplace with a smart engine that will match orders between borrowers and lenders, with algorithmically derived interest rates based on supply and demand will also be made possible. Easy access of SDX token holder to stake and earn passive profits from trade fees will also be ensured.

That's not all; the platform aims to be the forerunner in providing solutions to trade bitcoin in the ETH ecosystem using counterparties. The platform, being DeFi based, aims to ensure that each SDX token holder has the right to control the stable coins and send proposals to alter the platform rules that the community will vote on via the Governance token that is native to the ecosystem.

It is important to note that the Swapdex will go on its blockchain that is fully compatible with other Blockchains, such as the Ethereum ERC20, token standard in the future. This blockchain can be used in Ethereum-based smart contracts, allowing a wider user base for our platform's future scaling and the products and services we offer.

We envision an ecosystem where fast, easy, and affordable decentralized financial products and services that meet an individual’s needs are delivered in a timely, responsible, and sustainable way.
**SwapDex Competitive Advantage**

The first competitive advantage of Swapdex is that it aggregates all the Decentralized Financial Products in one place. The likes of which have not been seen with other projects in the industry. This gives SwapDex an edge over others. In addition to this, we aim to introduce the cheapest exchange fee the market has ever seen to our platform. As soon as we move onto our chain, we will give users near-zero gas fees on our exchange, which is currently making Ethereum based ERC-20 tokens more expensive to purchase but leaving users out of pocket when trading on other well know decentralized exchanges.

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Along with this, our staking system will allow SDX holders to receive rewards from all profits generated via trade fees through the exchanges carried out and real-world use cases. When the project moves forwards with the platform governing the voting system, it gives the community the power to further expand the ecosystem.

Finally, unlike other platforms that are only after the user’s money and profit racketeering, we have a dedicated website with multiple tethers of all the asset classes backed by value. This makes us distinct and highly competitive in the market.
Core Features of Swapdex

As earlier mentioned, decentralized finance is aimed to drive investment, trading, and financial inclusion options for people. However, no single platform offers an “all-in-one” approach to all decentralized finance products. This leaves a significant gap in true decentralized financial inclusion globally, and that’s where Swapdex is different from the rest.

The Swapdex ecosystem’s implementation unifies the internal and external operating system with our customer-centric approach to providing a seamless experience to our users. They can trade, swap, lend, and manage their cryptocurrency assets on a single platform. Our platform is designed to deploy a futuristic financial service platform regarding an omnichannel and cross-functional customer journey. Highlighted and explained below are some of the core features of Swapdex.

Swapdex Protocol

The SwapDex Protocol, built on the Ethereum blockchain, enables users to create currency. Current elements of the SwapDex Protocol are the USDX stablecoin, SwapDex Collateral Vaults, Oracles, Decentralized Exchange, and Voting. SwapDex governs the SwapDex Protocol by deciding on key parameters (e.g., stability fees, collateral types/rates, etc.) through SDX holders’ voting power. The Swapdex Protocol, one of the decentralized applications (dapps) on the Ethereum blockchain, uses future Decentralized Finance technology (DeFi) application to help the platform earn significant adoption.
Our Swap exchange is a seamless wallet to wallet experience giving users ease of access to hundreds of markets straight out of their wallets. Liquidity providers can benefit from adding to pools to earn a percentage of the fees; new projects can also use our governance voting to get their tokens listed.

Swapdex offers non-custodial ownership of the underlying assets on the platform. With us, trading is instantaneous as long as there is sufficient liquidity. Luckily, Swapdex offers a minimal fee to allow users to swap assets at little to no cost. Unlike centralized exchanges, there is no need for a KYC to use Swapdex exchange. Simply connect your wallet and start trading. No profile or background information is required.

There has been a surge of new liquidity sources recently, with over $4Bn capital spread across more than 15 sources and new ones coming up every week. As a result, DEX liquidity has become more fragmented than ever, making it more complex for DeFi users to find the best price for a given trade. This, in turn, has led to the rise of aggregation, which has grown significantly over the last 12 months — representing approximately 9.6% of total DEX trading volume in Q3.
However, aggregation is still somewhat misunderstood. For example, while quoted price is often used as the only metric to compare aggregators’ performance, it is not uncommon for some aggregators to quote $100 and consistently settle at $90. The quoted price does not reflect what the user ends up with, so it poses the question if this is the right metric to compare aggregators’ performance. We aim to bring more transparency to the industry and open up the conversation on measuring and comparing aggregators’ performance objectively.
Swapdex DEX aggregator

7 out of 10 times SwapDex Protocol offers better-adjusted prices than 1inch, Dex Ag, Paraswap, and Uniswap. That is, the price after transaction fees are paid. SwapDex Protocol delivers market-leading gas efficiency. With a custom, highly-optimized architecture, accessing Uniswap’s liquidity through SwapDex Protocol is now as cheap and often cheaper than going to Uniswap directly.

Aggregators exist to remove the mental hurdle of finding the right platform to trade by guaranteeing that you get the best the ecosystem has to offer. However, not all aggregators are created equal: they have different performance levels in terms of pricing, quoted price accuracy, gas usage, revert rates, and response times. The best-quoted price doesn’t always result in the best-adjusted price. Just like buying an airline ticket, you need to be careful about hidden fees/costs. While the base ticket might be cheaper, when you price in all of the add-ons (baggage fees, preferred boarding, seat assignments, etc.), you might end up paying more. SwapDex Protocol is launched by SwapDex Foundation to offer DeFi developers and traders a simple way to buy and sell assets at the best price possible across all DEX liquidity sources.

Metric for Aggregators

We believe the following principles must guide a team in building a high-performing, professional-grade aggregator:

1. Accuracy

An aggregator should be accurate — that is, the price at settlement should equal the price quoted. Slight variance is acceptable as there will always be market movements between the time a trade is submitted and the time that trade is confirmed on-chain.
However, all else equal, an aggregator that quotes more accurate prices is a better product. What you see should be what you get.

2. Low cost

More work performed on-chain results in more gas used, leading to higher gas costs. An aggregator should aim to lower the overhead as much as possible to ensure the user is getting the best deal. An aggregator should also adapt to the current gas price market and adjust routes accordingly. Every dollar spent on gas should earn the user more.

3. Low revert rates

An aggregator protects its user by maintaining low revert rates across all trade sizes. It is a frustrating experience when a transaction fails as the user still pays for gas. Ultimately, we combine these principles into a single golden metric: adjusted price.

This study analyzes the metrics mentioned earlier individually, but we focus primarily on adjusted price. Adjusted price is what a user receives after a transaction is completed on-chain, and transaction costs (gas and fees) are paid. The adjusted price can be calculated using the following formula:

\[
\text{Adjusted Price} = \frac{\text{sold amount USD}}{(\text{bought amount USD} - \text{transaction costs USD})}
\]

We believe this is a better metric to use for comparing aggregators as it is what the user ultimately gets in their wallet. Let’s use an example to illustrate this:

A user wants to trade 100 DAI for USDX. Aggregator #1 quotes 100 USDX with a transaction cost of $5. Using the formula above, we can determine that adjusted price = \(\frac{100}{(100-5)} = 1.05\). The same user checks out a second aggregator. Aggregator #2 quotes 104 USDX for the same 100 DAI, but with a transaction cost of $10. In this case, adjusted price = \(\frac{100}{(104-10)} = 1.06\). In this example, Aggregator #1 wins as it ultimately finds a cheaper rate for the user to convert 100 DAI to 100 USDX. While Aggregator #2 initially quoted a better rate and bought more tokens, you can observe how the transaction cost impacted the adjusted price. In conclusion, spending an additional $5 only to receive an additional 4 USDX resulted in a more expensive deal for the user.
SwapDex Protocol outperforms other exchanges, on average, 72% of the time. This means that a trader using a SwapDex Protocol integrator will receive the best price available across all DEX 7 out of 10 times. When it comes to adjusted prices, we observe a difference in winning rates as the value size increases. For low-value trades, Uniswap performs well since transaction costs are cheap relative to most aggregators. As trade sizes increase, aggregators perform their function and begin to split trades across multiple different sources. SwapDex Protocol performs well on all trade sizes, and other aggregators start to become competitive as the trade sizes increases. An aggregator like 1inch, for example, becomes increasingly competitive with SwapDex Protocol in larger trade sizes due to their large number of supported sources.
The data shared in this section comes from a simulation tool we built at SwapDex Protocol that allows us to continually quote and execute trades for various token pairs, trade sizes, and confirmation delays. For the more technical crowd, the simulation is done by performing an eth call on a Geth node and using state overrides to fund and track swaps, which includes metrics such as tokens bought and sold as well as the gas used. The exchanges under observation are SwapDex, 1inch, Dex Ag, Paraswap, and Uniswap. For this study, we used the 20 most traded pairs across DEXs. Using their publicly available APIs, we sampled an average of 11,995 trades per exchange. Trade sizes ranged from $100 to $1M, and settlement delays varied between 0 and 180 seconds (simulating the time spent waiting in the mempool). The simulation ran for a period of ~78 hours, during which gas price fluctuated between 47 and 194 gwei; this allowed us to ensure the study reflected market conditions.

In this study, we analyze three different prices, so let’s define them:

1. Quoted Price
   In this study, we analyze three different prices, so let’s define them:

2. Realized price
   This is the price that is settled after a delay. The time it takes between the trade submission and confirmation on-chain is typically between 0 to 180 seconds.

3. Adjusted price
   This is what a user gets once a transaction is realized and transaction costs (gas and fees) are paid. In other words, the realized price minus costs.
Many aggregators seem to optimize for the quoted price. However, the best-quoted price doesn't always result in the best-adjusted price. You can notice that Uniswap is no longer present in any of the trade size buckets. It is in stark contrast to showing the adjusted price winners. In other words, while it does not display the best price, sometimes it offers better-adjusted prices for trades under $5K due to low fees. As mentioned before, this winning percentage shrinks significantly in the higher value trades as aggregators perform better by splitting trades across sources to find the best price.

You can also observe SwapDex Protocol's winning rate is quoted and realized prices are significantly lower than its winning rate for the adjusted price — averaging 19% for quoted and realized prices and up to 57% and 63%, respectively, when we include ties. SwapDex Protocol's average winning rate for adjusted prices is ~72%. The winning rate is lower for quoted and realized prices because we made an explicit trade-off in designing our smart order routing logic to account for gas costs when calculating the order's trading route. By accounting for gas costs in SwapDex Protocol smart order routing, we guarantee that the benefit in price outweighs the cost of sourcing liquidity from various sources.
Unfortunately, many aggregators appear to optimize to win quoted price: the “sticker” price, enabling them to attract more users. However, as exemplified at the beginning of this report with Aggregator #2, aggregators who do not account for the transaction cost perform better at the quoted price as they are willing to spend more. However, it actually results in less value for the user. As a result, the best-quoted price doesn’t always result in the best-adjusted price.

A good analogy for this is airline tickets. Have you ever booked a flight through a certain airline because it seemed cheaper than the others, but then you had to pay extra for choosing your seat and then a little more for checking in your luggage? While the base ticket might be cheaper when you price in all of the add-ons, you might end up paying more. A similar thing happens with some aggregators: the price seems to be better than others when you get the quote. Once the transaction is completed, you end up with a lot less money than you should have.

Let’s take 1inch, for example, since they have the highest winning rate for quoted and realized prices. Their winning rate shrinks significantly from quoted to realized to adjusted price, declining from 22% to 19% to 14%. This means that while 2 out of 10 times, it might appear to be a better deal, it is not often the case once settled and minus costs.

The variance between quoted and realized prices can generally be explained by either inaccuracy or changes in the market that occur during the time delay between quote and on-chain settlement — which can make the quoted price no longer available. The variance between realized and adjusted is simply the additional cost incurred by the aggregator.
Let’s take a look at accuracy across all of the exchanges. When an exchange quotes a certain price, how often can they deliver? SwapDex Protocol and Uniswap consistently have positive variance, indicating a price movement between the quote and the on-chain settlement of the trade in the user’s favor. This is known as positive slippage. When this occurs, SwapDex Protocol always transfers the positive difference to the user.

Accuracy is important as it builds user trust. It demonstrates the price quoted by an aggregator is the price the end-user will receive. Given enough time and samples, the variance should approach 0.

Interestingly, 1inch’s variance is always below 0, which indicates that users never receive a better rate than the quoted price, regardless of how markets move. A variance below 0 could also indicate that an aggregator uses stale information to provide quotes or their response times are not fast enough. These issues may lead to a higher chance of transactions reverting. No tokens are bought or sold in a reverted transaction, but the user still has to pay the transaction fee.

When it comes to aggregators, the adage “less is more” applies. It is good for an aggregator to spend more if it extracts more value for the user. However, as we presented earlier in the adjusted price winners graph, most aggregators cannot do so. Optimizing the code to lower the gas usage increases the likelihood that an aggregator can split the trade over more sources to extract more value.

Despite increased gas usage, SwapDex Protocol can extract more value for the users 7 out of 10 times. All other aggregators are at least double the cost of SwapDex Protocol — which means it is double the cost for the user, with little additional value extracted. Uniswap is one of the cheapest exchanges in gas usage, so it is a goal all aggregators should aspire for, especially for the lower value buckets. It is improbable that a $100 trade will be split over multiple exchanges, even when gas prices are 1 gwei.

On average, SwapDex Protocol has an increased cost over Uniswap. Despite the increased gas usage, SwapDex Protocol can extract more value for the users 7 out of 10 times. All other aggregators are at least double the cost of SwapDex Protocol — which means it is double the cost for the user, with little additional value extracted. The highest gas guzzlers are 1inch and Paraswap, which is reflected in their low winning rate for adjusted prices.
To put things in perspective, below is the average cost in dollar value of all simulated trades between $500 and $1K:

- SwapDex Protocol — $6.43
- 1inch — $13.58
- Dex Ag — $13.41
- Paraswap — $18.59
- Uniswap — $3.93

Reducing gas usage has been a focus for our team for the past eight months. Our initial target was to cut down transaction costs by 50%; however, in SwapDex Protocol, we achieved to cut down transaction costs, on average, by ~76%. Gas usage is currently around 460K gas for a $50K trade, down from 1.5M gas for the same trade. These optimizations have turned SwapDex Protocol into the most efficient aggregator across all trade sizes.

In fact, gas prices have been quite higher than 100 gwei in the last month. We wanted to show you how SwapDex Protocol’s adjusted price winning rate looks like in this scenario. We ran a second simulation artificially pumping gas prices. The results show that SwapDex Protocol outperforms competitors in a high gas price environment, too — offering better-adjusted prices 8 out of 10 times when gas prices are above 400 gwei. SwapDex Protocol outperforms competitors in a high gas price environment. It also offers better-adjusted prices 8 out of 10 times when gas prices are above 400 gwei.
Now, back to SwapDex Protocol gas usage in comparison to Uniswap. SwapDex Protocol uses more gas than Uniswap, yet SwapDex Protocol offers better-adjusted prices than Uniswap 7 out of 10 times. How is this possible? At SwapDex Protocol, we built a super optimized contract that allows SwapDex Protocol to source liquidity that is 100% routed through Uniswap in a more gas efficient way than the default Uniswap contracts. This is particularly beneficial for smaller trades (<$5K), typically routed to a single source.

SwapDex Protocol delivers market-leading gas efficiency. With a custom, highly-optimized architecture, accessing Uniswap's liquidity through SwapDex Protocol is now as cheap and often cheaper than going to Uniswap directly. The Uniswap transaction cost ~114K gas, and the SwapDex Protocol transaction cost ~110K gas, which is 3.7% more affordable. Certain on-chain states and conditions can change the results (for example, if the user needs to set new allowances). In general, using SwapDex Protocol to trade on Uniswap is now as cheap and often cheaper than going to Uniswap directly.

So far, we’ve covered accuracy and gas usage, so it’s time to talk reverts. When a user makes a trade through one of these exchanges, what is the likelihood of the transaction failing?

Aggregators should aim to keep revert rates as low as possible. It is a frustrating experience when a transaction fails, and the user still pays for gas. Common causes for reverts are changes in the market between quote and on-chain settlement and inaccuracy of quoted prices (especially when using stale information to provide quotes).

Our tool always executes swaps under perfect conditions: fully funded, unlimited gas, and no front-running (i.e., no information is leaked to the dark forest). We exclude reverts caused by these reasons, and those in real life can occur due to user behavior. As a result, simulated revert rates are lower than real-world revert rates for all the exchanges. However, nevertheless, they provide valuable insights into the exchanges’ performance.
A delay below 10s essentially means that the trade is executed immediately or in the very next block after the transaction was submitted. A high revert rate in this delay bucket reflects inaccurate quoting as the window for market movements is very small. The 0–10 seconds delay bucket is particularly interesting to look at. A delay below 10s essentially means that the trade is executed immediately or in the very next block after the transaction was submitted. A high revert rate in this delay bucket reflects inaccurate quoting.

In general, we observe that Paraswap’s revert rates are the highest compared to the other exchanges, followed by Dex Ag and 1inch. One possible explanation for reverts in a simulated environment where human behavior is not a cause for reverts is that the price they quoted is gone or never existed. If you recall, Dex Ag and Paraswap had the most inconsistent accuracy ratio.

Let’s explore the impact of revert rates on an end-user. If a user makes 100 trades between $500 and $1K on each exchange, they will spend on failed transactions the following average amounts:

- SwapDex Protocol — $6.89
- 1inch — $62.52
- Dex Ag — $3.47
- Paraswap — $119.22
- Uniswap — $0.21

In the real world, we have seen Uniswap’s daily revert rate up to 30%. In contrast, in our simulation, we observed the highest revert rate, for it was ~1.3% for the long delay buckets. The difference between realized and simulated revert rates speaks to a vast opportunity to improve the UX in all DEXs, but that’s a subject for a different discussion.

In the case of SwapDex Protocol, the simulation shows we have, on average, the lowest simulated revert rates among aggregators across all the different delays. SwapDex Protocol simulated reverts range between 0.6% for the shorter delays and 1.8% for the longer ones. In the real world, we have observed that the average weekly revert rate is typically between ~3% and 4% for a SwapDex Protocol integrator.

SwapDex Protocol’s average weekly revert rate is typically between ~3% and 4%, 10X lower than other exchanges. Now, there’s one important metric we haven’t covered yet:
Response Times

This metric might not be immediately obvious to end-users of an application like SwapDex Protocol. However, when you build a product on top of the third-party infrastructure, you need the service to be as reliable and fast as possible. Faster aggregators allow users to get their trades quicker, resulting in lower slippage and reduced chance of reverts. Not to mention the improved user experience.

There's a technical challenge to maintaining low response times when we have to sample from more than 13 sources. One of them is RFQ, a system where professional market makers provide liquidity. However, our goal is for SwapDex Protocol to become the best professional-grade liquidity aggregation API. We are proud of our response times around 1.5s.

When you build a product on top of the third-party infrastructure, you need the service to be as reliable and fast as possible. SwapDex Protocol response times are consistently below 1.5s, up to 2.7X faster than other aggregators. 1inch's response times are the highest from all the exchanges analyzed, 2.7X times higher than SwapDex Protocol response times. At 4s, 1inch’s response times are about one third the time it takes to mine a new block, which can make or break a time-sensitive swap — for example, in high volatility days when market conditions are in flux.

Given all of the information above, what is a simple summary of the best aggregator to choose from? We can formulate the expected value of gains from switching from one exchange to another by calculating the average profit or loss from the switch across various trade scenarios. This will indicate the benefit a user can expect.
The SwapDex Formula for algorithmic pricing is central to the system’s design and potential because it enables Smart Pseudo Tokens to consistently determine their own reliable and predictable prices, which is ultimately essential for mass adoption of usable tokens. It is built on the idea, introduced in the previous section, that each Smart Pseudo Token maintains a ratio between its total value (total supply × unit price) and its connector balance. We call this ratio the connector weight or CW for short.

\[ CW = \frac{\text{Connector balance}}{\text{Smart Pseudo Token's total value}} \]

The Smart Pseudo Token’s total value, i.e., its market cap, is the amount of money one would get by selling every token (the entire Smart Pseudo Token supply) at its current price. The price of a Smart Pseudo Token is denominated in the connected token (for example, SDX’s price is denominated in ETH, its connected token).

\[ \text{Smart Pseudo Token's total value} = \text{Price} \times \text{Smart Pseudo Token supply} \]

These relationships are the keys to SwapDex’s pricing algorithm because they allow the system to algebraically solve each Smart Pseudo Token’s price as a function of its CW, the connector balance, and the Smart Pseudo Token’s outstanding supply.
At any given time, each connector always has an accurate and irrefutable record of the size of its balance and the current number of Smart Pseudo Tokens in supply, so that it only needs to know the CW to continuously calculate the correct price for a SmartPseudo Token while both its connector balance is changing (with buys and sells as well as connected token price movement). Its supply is changing (with buys and sells, which occur by sending to or withdrawing from the connector balance). The CW is expressed as a percentage greater than 0% and up to 100%. As mentioned, the creator is initially set by the creator when a Smart Pseudo Token is configured. The value chosen for the CW has significant implications for the pricing of the token. It may also be changed, depending on the Smart Pseudo Token’s chosen settings.

### Handling Price Slippage

We develop the equation for determining the price of a Smart Pseudo Token at any given point when buying or selling Smart Pseudo Tokens (thus increasing or decreasing their supply); their price moves! In fact, even the tiniest transaction moves the price of a Smart Pseudo Token to a new level, meaning that a buyer will get a different price if she splits her order into many small transactions. To address this, when needing to calculate an actual conversion price, we look at the total amount of tokens a Smart Pseudo Token must return to the buyer (in new Smart Pseudo Tokens issued) or seller (in connected tokens withdrawn from the connector balance) for a given amount of tokens received (of either the connected token from a buyer or the Smart Pseudo Token from a seller).

\[
\text{Tokens issued} = \text{Supply} \times \left( \frac{\text{Connected tokens paid}}{\text{Balance}} + \left( \frac{\text{CW} - 1}{\text{CW} + 1} \right) \right)
\]
The equation was derived by viewing a transaction due to many infinitely small transactions that each impact the Smart Pseudo Token’s supply and the connector balance, thus leading to a new price for each subsequent increment. The actual price for a given transaction size is the final price after each infinitely small increment of the transaction size has had its relative impact on the price. A formal mathematical proof is available here. The equations are similar for both buy and sell orders, where we derive the actual amount of the Smart Pseudo Token units from issuing (to a buyer) or connected tokens to withdraw from the connector balance (for a seller) for a given amount of tokens received by the Smart Pseudo Token contract.

$$\text{Connected tokens paid out} = \text{balance} \times \left( \frac{CW}{\sqrt{1 + \frac{\text{Token destroy}}{\text{Supply}}}} \right) - 1$$

We can now calculate the effective price of a transaction by considering the amount of Smart Pseudo Tokens converted per connected token, i.e., the price of a Smart Pseudo Token in terms of its connected token. This effective price will be different for each transaction size and vis-á-vis each connector in the case of more than one.

$$\text{Effective price} = \frac{\text{Connected tokens exchanged}}{\text{Smart Pseudo Tokens exchanged}}$$

The effective price has the desired property of ten small transactions or one large transaction of the same cumulative amount leading to the exact cost.
Pricing Example

For example, we take a Smart Pseudo Token that currently has a supply of 1000 tokens, with a connector currently holding a balance of 250 of the connected tokens and a CW of 50%. This Smart Pseudo Token can be converted into its connected token at the following price:

\[
\text{Price} = \frac{250}{1000} \times 50% = 0.5
\]

Suppose a buyer wants to convert 10 units of the connected token into Smart Pseudo Tokens. How many Smart Pseudo Tokens will she receive?

\[
\text{Tokens issued} = 1000 \times \left(1 + \frac{10}{250}\right) \times 50% \approx 19.8
\]

Considering the amount of Smart Pseudo Tokens issued, we can now derive the effective price when converting 10 units of the connected token into the Smart Pseudo Token:

\[
\text{Effective price} = \frac{10}{19.8} \approx 0.5051
\]

Note how the effective price is different from the quoted price, in this case, slightly higher. The difference is due to the price slippage for this particular transaction size explained in the previous section. In other words, each infinitely small incremental unit of the 10 tokens converted a lead to upward pressure on the price by adding to the connector balance and the Smart Pseudo Token supply. Effectively the buyer has paid for the price slippage caused by her transaction. The buyer can perform these calculations in advance of sending her tokens to the smart contract, allowing her to gauge how the price will move in response to her conversion. The predictability and uniformity of the price slippage is a key benefit of the SwapDex formula.
As a Smart Pseudo Token processes conversions, the price will converge toward an equilibrium between buying and sell volumes. For this to happen in a classic exchange model where buyers and sellers are matched to each other, there must be sufficient liquidity for two orders to be reliably matched at any time.

This is not a requirement of the SwapDex Protocol because Smart Pseudo Tokens always process buys and sells immediately by converting them via their connector balances and, therefore, calculating prices continuously over time. Whereas prices are traditionally calculated for each trade independently (when a buyer and seller are matched), each conversion of a Smart Pseudo Token progressively and directly impacts its price. This makes SwapDex’s price-determination mechanism truly asynchronous.
Balanced Prices through Arbitrage

Smart Pseudo Tokens may also be traded on various exchanges. Their market price could potentially diverge from the price quoted by the Smart Pseudo Token. Since Smart Pseudo Tokens do not have functionality for observing prices in the external world, it appears that there is a risk of the Smart Pseudo Token’s price fragmenting. However, such a situation is unlikely to last for long because it constitutes a clear arbitrage opportunity.

For example, suppose the market price moves higher than the price quoted by the Smart Pseudo Token. In that case, anyone could buy from the Smart Pseudo Token and sell on the market until prices even out. The ability to arbitrage effectively incentivizes market participants to create price consensus between the Smart Pseudo Token and external prices. It is also worth noting that the Smart Pseudo Token functionality of issuing new units and increasing supply (when connected tokens are added to the connector balance) exists only when interacting with the Smart Pseudo Token directly.

Smart Pseudo Tokens listed, bought and sold on external exchanges, or moved directly between people, do not trigger this functionality but circulate existing supply. Nevertheless, the prices at which existing supply is offered will have an effect on the prices of Smart Pseudo Tokens as quoted by the Smart Pseudo Token contract via the arbitrage mechanism outlined above.
### Staking

Staking is also becoming a popular way to earn a return on capital. Users in some networks and protocols lock their tokens and play a key role in providing consensus to a distributed network. Although somewhat distinct from the DeFi ecosystem, staking is another activity recording phenomenal growth and sparking interest.

With Swapdex, users will be able to stake their tokens and earn rewards on them. The value of the stand-in token will be tied to the underlying assets. For instance, a user who holds ETH and uses USDX for trading can deposit their ETH into a liquidity or lending pool to earn rewards from trading and loan fees. In this case, a user benefits both from increased trading capital and from earning fees from their deposited ETH. Positions may be liquidated in the event of extreme volatility or if oracle systems are compromised. However, these risks are lower on Swapdex than other hybrid services such as Uniswap and Aave.

### Lending

Crypto assets sitting in a wallet don’t accrue interest. The underlying value may increase or decrease, but you’re not earning anything for holding that particular cryptocurrency. Imagine being able to lend your crypto to someone else and earn interest on the loan. That’s how banks currently work, but it’s a service that few individuals can access. Swapdex offers In house & P2P loans.

Using the SDX token, users can take out loans from the house or with other users based on their equity held in the SDX token; this way, holders can put their assets to work instead of selling on the open market; with this, the selling pressure is reduced. Interestingly, users can loan and easily redeem the token after paying a small interest rate. By lending crypto assets to others, users can generate interest in those assets. There are a wide variety of ways to do this, but the main way is through lending pools.
The USDX stablecoin is a decentralized, unbiased, collateral-backed cryptocurrency that is soft-pegged to the US Dollar. USDX is held in cryptocurrency wallets or within platforms and is supported on Ethereum and other popular blockchains. Rewards in our treasury will also be paid out in our USDX stable coin, and this will help increase its use case and drive massive adoption.

USDX is easy to generate, access, and use. Users generate USDX by depositing collateral assets into Vaults within the Swapdex Protocol. This is how USDX is entered into circulation and how users gain access to liquidity. Others obtain USDX by buying it from brokers or exchanges or merely receiving it as a means of payment.

Once generated, bought, or received, USDX can be used in the same manner as any other cryptocurrency: it can be sent to others and used as a means of payment for goods and services.

Every USDX in circulation is directly backed by excess collateral, meaning that the collateral value is higher than the USDX debt value. All USDX transactions are publicly viewable on the ethereum blockchain.
Platform Governance

Governance and decisions on Swapdex will be completely decentralized, and Swapdex Token will govern it. Holders of the token will have voting rights and power based on the amount of tokens they have and can debate, propose, and vote on all changes to Swapdex. This will allow the Swapdex network to be upgraded by anybody with a good idea of how the platform can function better. They are incentivized to provide good governance.

According to available DeFi protocols, there are two methods by which a user can delegate their voting rights or cast votes on proposals: either calling the relevant functions directly; or using signature functionality. A key benefit to delegates using signature functionality is that they can create a signed delegate or vote transaction for free and have a trusted third-party spend ETH on gas fees and write it to the blockchain for them.

For a proposal to go through, the majority of the votes cast must be in favor. If there are more than two options, the one with the most votes win. You will need to hold unlocked Swapdex tokens to vote and lock them in the platform until the voting period ends.
Platform Technical Details

6.1 Distributed architecture with DNS Failover

The platforms keep up DNS failover to provide DDOS resilience as well as fast failover. In the case of a server outage, the failover time is at 180 seconds (depending on DNS TTL). Geo IP routing incredibly provides rapid access for users across the globe by routing track based on their geo-position. Architecture built upon the latest technical structures by employing the most up-to-date software can alleviate leaks' threats based on the immaturity of software. Our constant updates and technological developments will consistently enhance the overall resilience of the exchange.

6.2 Automated multi-signature cold storage

The exchange's hot wallet has an automated procedure that swaps the crypto funds to multi-signature cold storage according to the pre-decided equation of hot wallet storage concerning the total funds, ensuring that a majority of the assets are protected in the event of an attempted hack or a brute attack on the platform.

6.3 Automated trade and account related notifications

The users have access to automated trade-related notifications regarding order matches, order books, charts, etc. The current and historical data, including a detailed list of debit or credit entries, transaction fees, etc., will be made available.
A professional analysis guide is essential for successful trading. Currently, graphical analysis of the following tools is in a later stage of development. It will be available after the token sale and launch of the platform. Since the public trading platform does not have access to the user data, a new security standard is set here.
The contemporary methodology of marketing is through the digital medium. However, the Swapdex ecosystem will use different marketing strategies to promote the platform and get the word about its novel decentralized finance solution out there.

We have thus strategized a well thought out plan; the main pillars include:

We will be using influencers' service with massive followers on social media platforms like Twitter and Facebook. We will also invest in content marketing strategies using platforms like Medium and Quora.

We understand how far digital PR can go, so we’ll be using PR agencies with a proven track record of success and leverage their expertise and experience to market the platform to get the word out there.

We will also be providing competitions, videos, and information on our Social media platforms such as Twitter, Telegram, and the implementation of a Referral System.
Below is a summary of our proposed methods of marketing:

- Social media/ Influencer marketing
- SEO(News Portals, PR, listing websites and blogs)
- Content Marketing (YouTube, Steemit, Medium, Telegram, Bitcoin talk, Reddit, Hacker noon and other platforms which act as executive tools and medium))
- Referral programs/ Affiliate marketing
- Industry events/ exhibition
- Brand partnerships
Swapdex Token Features

Swapdex Token is a utility token created on the ERC20 Ethereum blockchain. Utility tokens are tokens intended to provide digital access to an application or service through a blockchain-based infrastructure. Swapdex token allows access to the platform’s activities while also providing specific values such as adding as collateral and platform governance purposes to its holders. Its key features include:

- ERC-20 based token used within Swapdex Ecosystem
- It will power future Swapdex services and products
- Provide access to governance and decision making on the platform
- Faster transaction times
- Quicker payment settlements

Tokenomics

- Token name: Swapdex token
- Symbol: SDX
- Mineable: No
- Maximum tokens created: 1,000,000,000
- Maximum tokens: 10,000,000 DeFi
- Hard cap: 3,000 ETH
- Soft cap: 1,500 ETH
SwapDex is looking to raise investment with a hard cap of 3000 ETH to help build out a next-generation exchange and DeFi with real-world use cases. The soft cap is 1500 ETH, of which 300M tokens will be sold during the Presale.

Any tokens not sold during the 3 rounds of presale will be burnt to reduce the token supply, drive up demand, and give more value to the SDX token.

- **PUBLIC LIQUIDITY:**
  - (40%) 400,000,000 SDX

- **TEAM ALLOCATION:**
  - (10%) 100,000,000 SDX

- **OTC PRESALE:**
  - (30%) 300,000,000 SDX

- **COMPANY ALLOCATION**
  - (20%) 200,000,000 SDX
### Team

We understand that having a strong management team and a proven business strategy is fundamental to our project’s success. Our portfolio constructs are primarily driven by our focus on the industry as a whole. This is why only the best brains in the industry have come together to achieve this landmark feat.

Our team consists of impressive experts in the blockchain and cryptocurrency niche, professionals in the finance industry, and thought leaders in tech.
Web Presence

- swapdex.net
- swapdex
- officialswapdex
- swapdex0