

Mira: An On-Chain Passive Investment Vehicle

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Abstract

Mira is introducing on-chain index investments, a new way for investors to gain broad exposure to the cryptocurrency market. Indices are designed to track the performance of segments of the crypto market or specific themes within the ecosystem. Fully redeemable tokens (the "index tokens") are then created to replicate each index. Each token is backed by a 1:1 reserve of assets held by a regulated custodian, whose assets are sourced from multiple blockchain networks. This approach offers compliance, transparency, and self-custody.

Introduction

The traditional narrative in finance is that professionals possess unique knowledge and expertise that the average investor lacks. As a result, they charge high fees for managing money and argue that achieving superior returns requires complex strategies and expensive resources. But ever since Vanguard launched the first retail index fund in 1976¹, indices have provided a simple, cost-effective vehicle for investors to achieve diversification without needing active management. The same principles of simplicity and cost-effectiveness can be applied to the cryptocurrency market, which currently presents a complex and technically challenging landscape for new investors. Despite the industry's significant growth and increasing acceptance since 2018, there are limited options for investors who want to participate in the potential growth of the market. With increasing institutional and retail interest, demand for low-cost, diversified investment options for digital assets will grow similar to ETFs in traditional finance, which grew from \$675 billion in 2008 to \$8.4 trillion in 2021².

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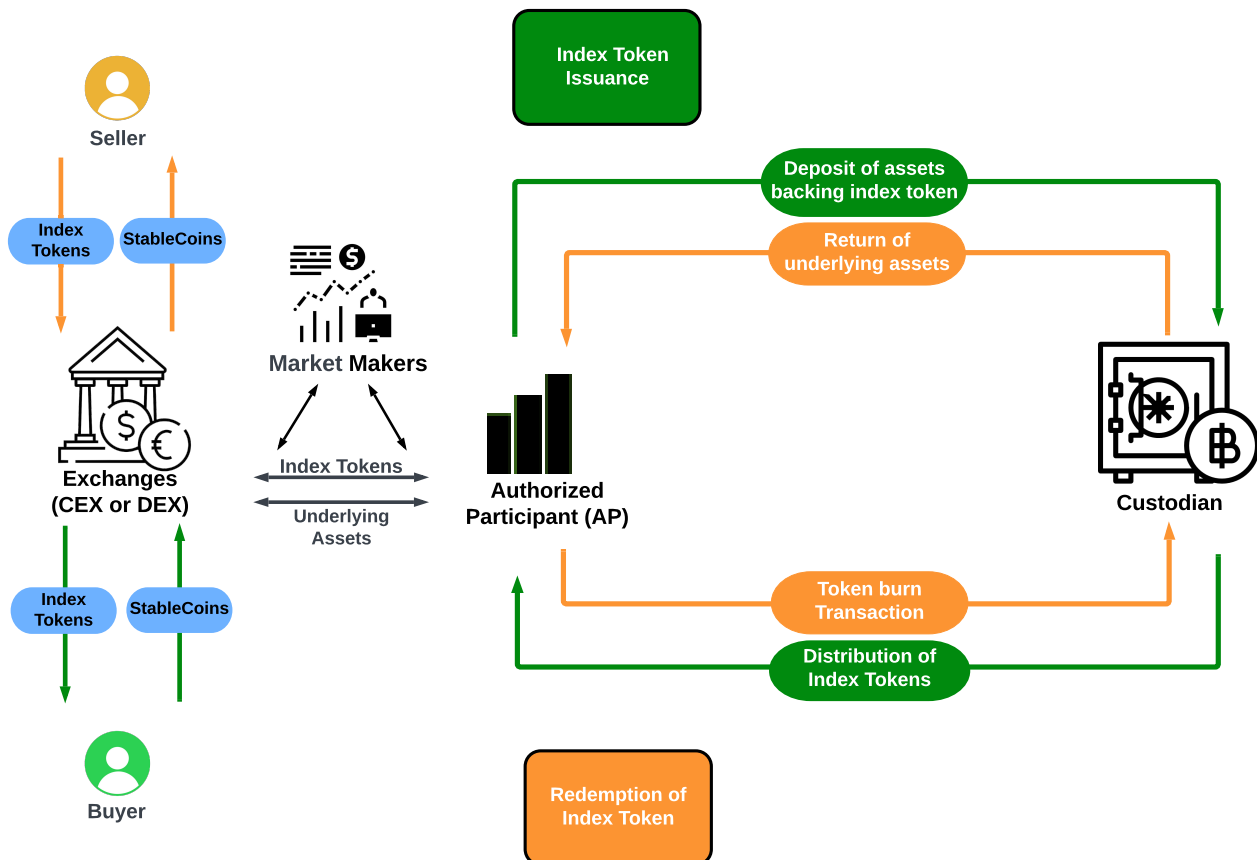
<https://screener.fidelity.com/ftgw/etf/goto/snapshot/newsStory.jhtml?symbol=V00&storyid=202208311130BENZINGAFULLNGTH12290408>

² <https://www.blackrock.com/au/intermediaries/ishares/authorized-participants-and-market-makers#>

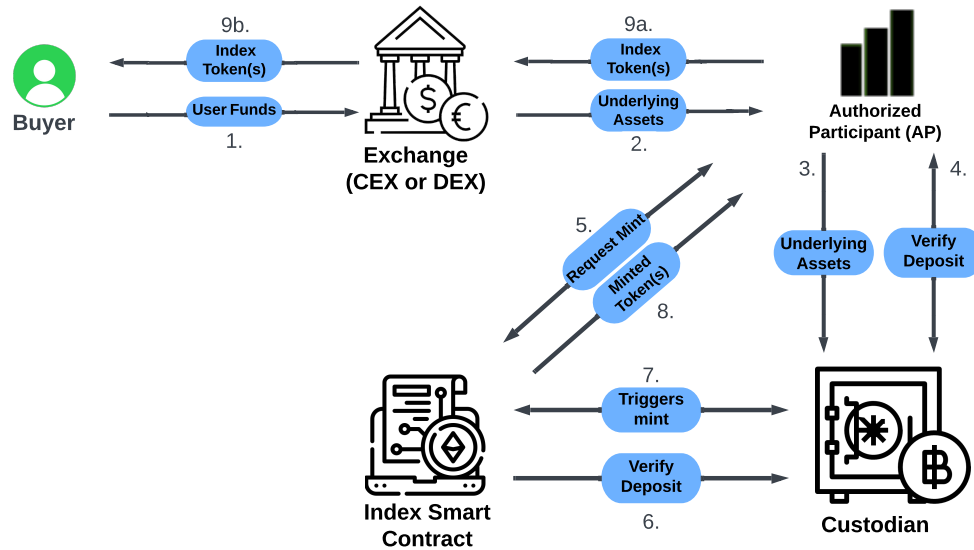
Objective

The crypto market is expanding rapidly and can be confusing and daunting for investors to navigate. Mira seeks to simplify cryptocurrency exposure with broad and thematic index funds rather than having clients trade individual assets, analyze whitepapers, and keep up with market trends. Mira indices are built on top of regulated custodians to ensure their 1:1 backing with underlying assets. As custodians offer assets from multiple blockchain networks, these indices will be cross-chain without needing to source liquidity from outside their ecosystem. To allow for greater accessibility for investors, the tokens will be cross-chain and exist on other blockchain networks through bridge networks such as LayerZero and Axelar. To improve trust and decentralization, Mira offers ZK-snark for users to ensure the underlying tokens are backing the index without revealing sensitive information about the custodian or index. Further insight into ZK-snarks and cross-chain bridges are on page 12.

Technology Overview



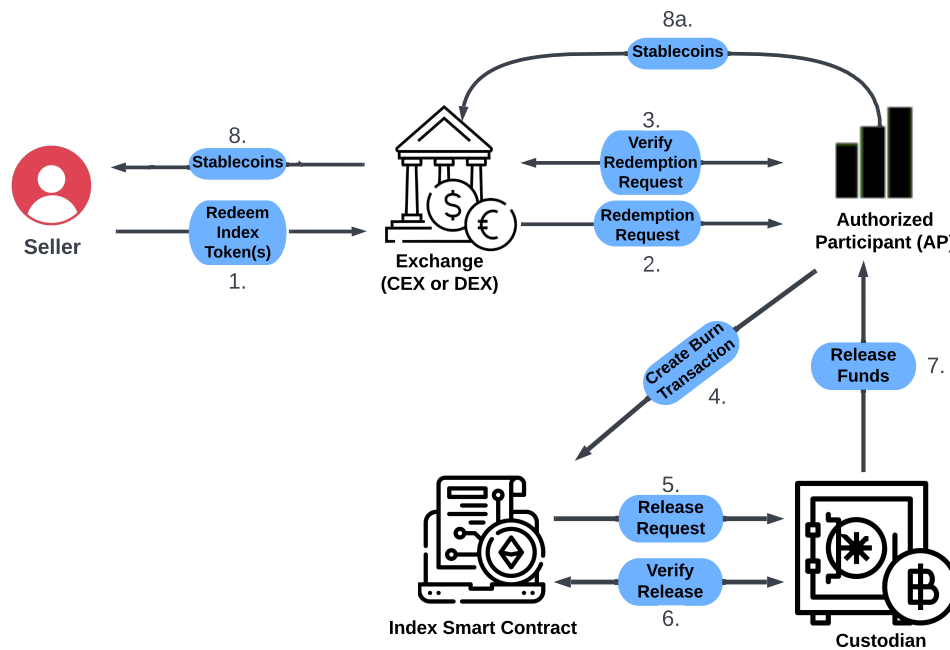
Index Token Issuance



When an investor requests to buy an index token, the authorized participant mints a new token and sends it to the investor's wallet. The funds from the purchase are used to buy the underlying assets of the index and are safely stored with a custodian.

1. A user purchases x index tokens on an exchange (CEX or DEX).
2. Through the exchange, user funds are converted into the underlying assets of the index and sent to the authorized participant.
3. Authorized participant deposits underlying assets for x index tokens into the custodian.
4. The custodian verifies the deposit and confirms with the authorized participant that the funds are received.
5. The authorized participant requests the smart contract to mint x index tokens.
6. The index smart contract verifies the deposit with the custodian.
7. Verification triggers the smart contract to mint the corresponding amount of index tokens.
8. The smart contract sends the index to the authorized participant's wallet.
9. The authorized participant sends the index tokens to the exchange (9a.) who deposits the index tokens to the user (9b.).

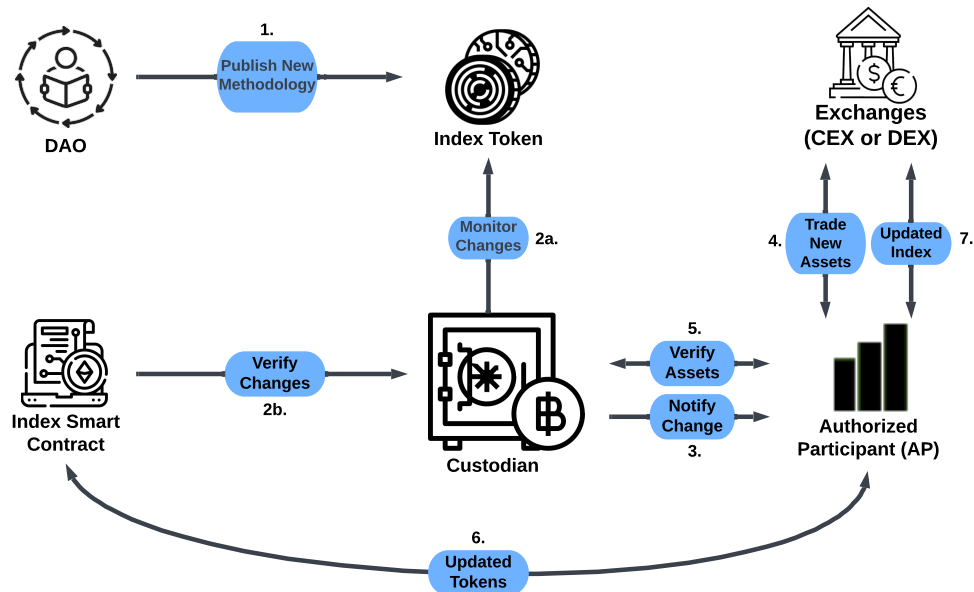
Token Redemption



When an investor requests to redeem their index token, they will sell it on an exchange (CEX or DEX), and the exchange will request redemption from the authorized participant (AP). The AP will verify the redemption request and send a burn transaction to the index fund smart contract, which triggers a token burn, reducing the total supply. The underlying assets are sold, and stable coins are sent back to the seller.

1. The user requests to redeem index tokens from the exchange.
2. Exchange requests redemption from the authorized participant.
3. The authorized participant verifies the redemption request.
4. An authorized participant sends a burn transaction to the index smart contract where the token is burned.
5. Smart contract sends a release request to the custodian.
6. The custodian verifies the release request.
7. The custodian releases the underlying assets to the authorized participant.
8. The authorized participant converts the assets to stablecoins and sends them to the exchange that deposits the funds to the user.

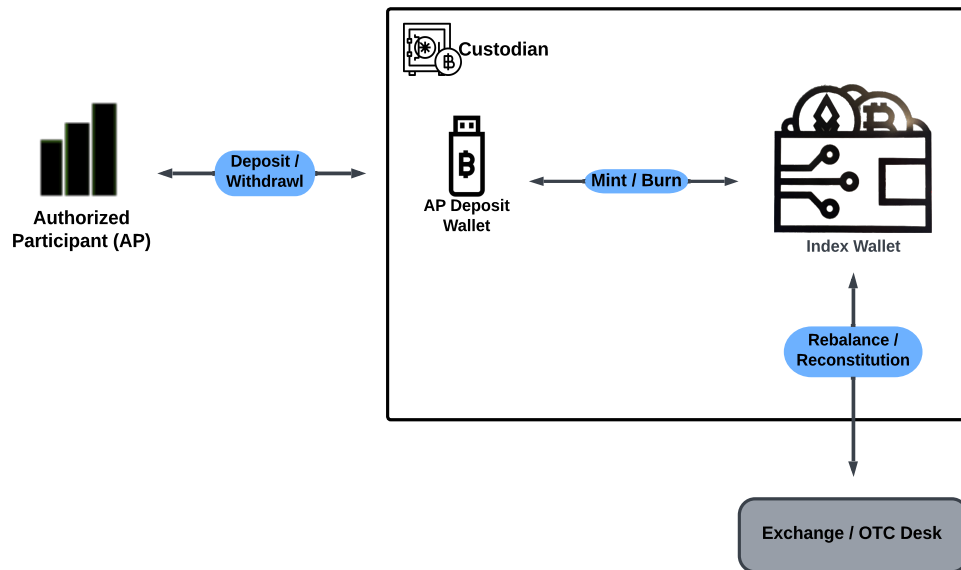
Rebalance/Reconstitution



Quarterly reconstitution and rebalancing take place when the Decentralized Autonomous Organization (DAO) publishes changes to the index methodology and shares them with the custodian. The custodian amends the asset distribution of the index fund and notifies the authorized participant to purchase the updated methodology on an exchange. The custodian verifies that the authorized participant's assets are correct and stores them in a custodial wallet. The smart contract updates existing tokens for the index fund that can now be traded. The DAO publishes changes to the index composition and methodology.

1. The custodian adjusts the composition of assets in the index fund to align with the new index methodology.
2. The custodian communicates the changes to the authorized participant
3. Authorized Participant executes trades on the exchange to acquire the appropriate assets to match the new index composition.
4. The custodian verifies that the assets acquired by the AP match the updated index composition and stores them in the index fund's wallet.
5. The smart contract mints new tokens representing shares of the index fund based on the updated index composition and methodology.
6. The reconstitution of the index is now complete, and the tokens can be traded on the exchange or OTC desk

Trust Structure



Based on the rules determined by the DAO, the authorized participant is responsible for depositing and withdrawing the underlying assets into a wallet set up by the custodian. The authorized participant buys/sells the underlying assets on an exchange or over-the-counter market (OTC) and deposits/withdraws them from the custodian's index wallet. The custodian then signals a mint/burn to the smart contract to keep the index fund token supply in line with the underlying assets. DAO governance is responsible for managing the overall strategy of the index fund including changes such as index reconstitution, asset allocation, and asset weighting.

Index Methodology

The index methodology determines an index's composition, rebalancing schedules, and reconstitution. Its rules may include the inclusion and exclusion of assets, as well as their weighting criteria. The methodology is established by the DAO and updated regularly to ensure it continues to accurately track its corresponding market or sector. Common methodologies used in index fund tokens include:

Market capitalization-weighted: Based on the size of the underlying assets in the portfolio. The bigger the asset, the bigger its weight in the index fund token.

Equal weighted: Provide each underlying asset an equal weighting in the portfolio, regardless of its size. This can result in a more balanced portfolio compared to market capitalization-weighted index fund tokens.

Factor-based: Based on certain investment factors such as value, momentum, or quality. They are designed to track the performance of a certain set of assets that have similar characteristics, such as high yield or low volatility/stablecoins.

Smart-Beta: These indices determine the weightings of its assets by a set of rules such as minimum volatility, maximum diversification, or risk-adjusted returns.

Themed: These index fund tokens are based on a specific theme, such as Decentralized Finance (DeFi), layer 1s, gaming, metaverse, infrastructure, etc. They are designed to track the performance of a specific set of assets that are related to the theme.

Active: These index fund tokens are managed by a professional fund manager and attempt to outperform a benchmark index by selecting tokens based on a mix of fundamental and technical analysis.

Token Inclusion Criteria

To be considered for inclusion into a Mira index, tokens must meet the following criteria:

Custodial Support: Tokens must be available with a licensed institutional custodian that ensures digital assets have a minimum maturity of 30 days and have been evaluated for security and legal risks, as well as liquidity depth.

Support from Exchanges: The asset must be traded on multiple reputable exchanges with viable liquidity. This is intended to ensure efficient trading and adequate liquidity during the issuance and redemption of the reserve constituents, thereby promoting the liquidity of the token.

Market Capitalization Minimum: Tokens must have a market capitalization greater than \$100,000 (Market capitalization = Current price * Circulating supply) on a reputable price oracle.

Market-Determined Price: Assets must not be tied to the value of any other asset, including fiat currency, reserves, algorithmically determined values, or other forms of collateral. This avoids duplication and over-representation of certain digital assets such as Bitcoin, Ethereum, and USDC, among others.

Upholding Proper Regulatory Standing: The token policy and governance must demonstrate a willingness to comply with relevant regulatory agencies and laws, even if the project is committed to decentralization. This is to protect token holders from digital assets that may be subject to a liquidation crisis from sanctions, rug pulls, and ponzinomics.

Security Inspection: Assets have at least two security audits from a reputable auditing agency to determine known vulnerabilities and meet the security standards established by the DAO to protect token holders from assets that may have critical vulnerabilities.

Readjustment Schedule

Reconstitution will occur on a traditional quarterly schedule, starting on the first day of January, April, July, and October. During the reconstitution process, the authorized participant, who is responsible for maintaining the composition of the index, will review the underlying assets and compare them to the rules set by the DAO (Decentralized Autonomous Organization). If changes need to be made, the authorized participant will buy or sell the underlying assets on the exchange or over-the-counter market and deposit or withdraw them from the custodian's index wallet. The custodian will then mint or burn the corresponding number of index tokens, to keep the index fund token in line with the underlying assets.

Rebalancing Schedule

The rebalancing schedule will occur on the first day of each quarter (Jan 1st, April 1st, July 1st, October 1st). During the rebalancing process, the authorized participant will buy or sell the underlying assets on the exchange or over-the-counter market and deposit or withdraw them from the custodian's index wallet. The custodian will then mint or burn the corresponding number of index tokens to keep the index fund token in line with the underlying assets. The rebalancing process ensures that the index fund token accurately reflects the performance of the underlying assets, and that its asset weighting remains consistent with the rules set by the DAO's methodology.

An emergency meeting of the DAO may be necessary to initiate a rebalance if there is a sudden change in market conditions or underlying assets that requires the index fund token to be rebalanced immediately. For example, if a protocol represented in the index suddenly goes bankrupt or experiences a drastic change in its financial performance, an emergency meeting of the DAO may be called to vote on removing that company from the index and replacing it with a different company.

Fees

An expense ratio, which is a percentage of an indices assets is taken as a fee for managing the index. Fees will range from 0.25%-0.95% depending on the type of index. The expense ratio for an index fund token may be paid to the custodian, the authorized participant, or the governance entity responsible for the fund.

Alternatively, the expense ratio may be built into the price of the index tokens, with the cost being passed on to the buyers and sellers of the tokens. However, this ratio will not be explicitly visible to investors rather reflected in the price of the index tokens.

Mira DAO Structure

Custodian: A trusted institution or party responsible for securely storing the private keys that control the various crypto assets. This role can be appointed by the governance body of the DAO.

Authorized Provider: Can be assigned to institutions or parties who are authorized to deposit underlying assets for the minting of index tokens. They are also responsible for sending instructions to the custodian to rebalance or reconstitute an index token.

User: The holders of index tokens. Users can use the index tokens to transfer, transact, and perform any other activity that requires fungible tokens on the blockchain the token is issued on.

Methodologies: Responsible for publishing the methodology of the index on a smart contract and updating it periodically. This role is assumed by the DAO and can be appointed by the governance body of the DAO.

Governance: Assumed by the party that has authority over changes in the token contracts, including management of whitelists and pausing/resuming issuance and redemption. The governance body will consist of authorized providers and users.

Mira DAO Responsibilities

The Mira DAO is responsible for managing the composition of the index, giving index holders control over these decisions while still passively tracking the market. This includes decisions such as:

Governance: Overseeing the management of the index fund and its operations, including the composition of the index, the rebalancing schedule, and the fee structure.

Transparency: Communicating the index fund's operations to its users and stakeholders, including the assets held in the fund, the fund's current net asset value, and expense ratio.

Risk management: Assessing the risks associated with the index fund, including the risks of underperformance and market volatility.

Custodial responsibilities: Overseeing the relationship to the custodian, who holds the underlying assets that the index fund token represents. The DAO ensures that the custodian safely manages the assets and that the assets match the number of index tokens in circulation.

Rebalancing and reconstitution: Overseeing the rebalancing and reconstitution of the index performed by the authorized participant based on the rules and guidelines set by the governance arm of the DAO.

Fees: Determining the fee structure for the index fund, including the expense ratio and any other fees associated with buying or selling index tokens. These fees are paid by the users of the fund to support the DAO's operations.

Deploying ZK-Snarks to Mira

By utilizing zk-SNARKs for checking custodian collateral, Mira maintains the privacy of the custodian's collateral information while ensuring that the fund's tokens are backed by sufficient collateral. This can help increase transparency to build trust in the fund for investors.

Mira can utilize zk-SNARKs to help improve:

Encryption: The custodian's collateral information can be encrypted using zk-SNARKs, allowing the index fund token protocol to verify the collateral without revealing the actual collateral amount or composition to any third party.

Proof of Collateral: The custodian can provide a zk-SNARK proof to the index fund token protocol, demonstrating they hold enough collateral to meet protocol standards.

Verification: The zk-SNARK proof is based on a pre-agreed set of parameters and by ensuring the custodians have sufficient collateral, the index fund token protocol reduces the risk of a custodian default.

Deploying Cross-chain Indices through Bridge networks

Mira can make its index fund tokens cross-chain with bridge protocols, providing greater accessibility for its investors. Mira is currently partnered with Layer Zero and Axelar, who offer:

Cross-chain Transfer: Allow for the transfer of tokens between different blockchain networks, enabling users to move Mira index tokens from one blockchain network to another.

Portfolio Rebalancing: Mira can use cross-chain bridges to move tokens between different blockchain networks and work with the AP to rebalance the fund's portfolio as needed. This allows the fund to maintain a target asset allocation and respond to changes in market conditions.

Vision

Blockchain has the potential to revolutionize the way we think about assets: upending financial markets with the tokenization of stocks, bonds, real estate, and art, while improving efficiency in money transfer and bringing security to inflationary markets. At Mira, we embrace change and work to improve access to the growing digital market for non-technical investors.

Index funds are a proven, popular investment vehicle for those seeking exposure to a diversified portfolio of assets. Our protocol builds upon this familiarity, allowing users to invest in a variety of assets through index tokens. By using smart contracts built on blockchains, we make these investments secure, transparent, and accessible. With the ability to tokenize new asset classes and the potential for cross-chain compatibility, we see a bright future for this technology.

Our mission is to provide a platform for users to enter the world of tokenized assets. We believe that index tokens are the perfect entry point for new investors, as they are similar to index funds/ETFs, seek to minimize risk, and do not require active management. By leveraging blockchain technology and a user-friendly experience, we build new digital investment opportunities to bring tokenization to the masses.