

Zero-Coupon

Monetary Policy

Strip



# Maze Protocol

A Zero-Interest Money Market

Powered by Liberalized Interest-Rate Pricing Mechanism

Perpetual Smart Bonds

Litpaper

June 2021



The maturation phase of the crypto market is characterized by a path-dependent, progressive adoption of crypto products by users of traditional money services. As smart contracts unraveled new areas for blockchain-based innovation, a plethora of different digital assets was created. However, the majority of blockchain protocols and dApps are not designed to solve problems that exist in traditional markets. In other words, the issuance of crypto tokens is usually not truly necessary.

In contrast to many existing protocols, Maze is designed from the ground up to disrupt a market with hundreds-of-years-long history. In fact, the core design enabling zero-interest loans put forth in this document has no counterpart in the traditional world. Maze Protocol can only be realized based on programmatic rules and cryptographic security inherent in blockchain-based smart contracts. The native token serves an essential role of regulating the dynamics between clients and the protocol, and is a natural byproduct of the design of Maze.

# Introduction

The DeFi movement is in the process of radically disrupting the incumbent global financial and international monetary ecosystems. By harnessing the power of decentralization and open source innovation, DeFi democratizes access to financial services for all. This completely unregulated, unstoppable decentralized ecosystem has grown into a massive >US\$100 billion market over the last year, with the focus on creating basic financial building blocks as alternatives to the existing institutional financial system. Automated market making exchanges (AMMs), lending platforms, and yield farming protocols have attracted an unprecedented amount of liquidity, facilitating the friction-free exchange of crypto assets. However, the nascent DeFi world is still highly fragmented and siloed, prohibiting a unified approach to accessing liquidity and yield across a wide spectrum of platforms. The current effective monetary policies of these decentralized platforms rely on idiosyncratic algorithms and project governance that make these markets highly volatile, subject to market manipulation, and exposed to hacking.

Maze represents the world's first universal, borderless, self-regulating, sustainable, and unstoppable protocol to regulate the pooling and distribution of global liquidity for all crypto assets. Maze's vision is to create a universal interest-rate mechanism with its power decentralized to all market participants, an infinitely scalable liquidity facility that is incentivized, secured, and driven by a vibrant trading community focused on arbitrage. A key innovation of Maze is to offer borrowers access to zero-interest loans, made possible through a tokenomic system powered by its native crypto token MAZE. **Expanded to its logical conclusion, Maze will evolve into a global monetary protocol for all ecosystems, eventually connecting both the crypto universe and institutional finance world.**

Behind Maze is a world-class blockchain team consisting of 50+ engineers that developed Farmbase, the blockchain-based middleware technology that makes Maze protocol feasible. Developed over the last 3 years, Farmbase is a key blockchain middleware infrastructure that supports the cross-chain deployment of Maze Protocol, bond/interest rate mechanism smart contracts, and the computationally-intensive MAZE yield calculations.

The Maze Protocol's features:

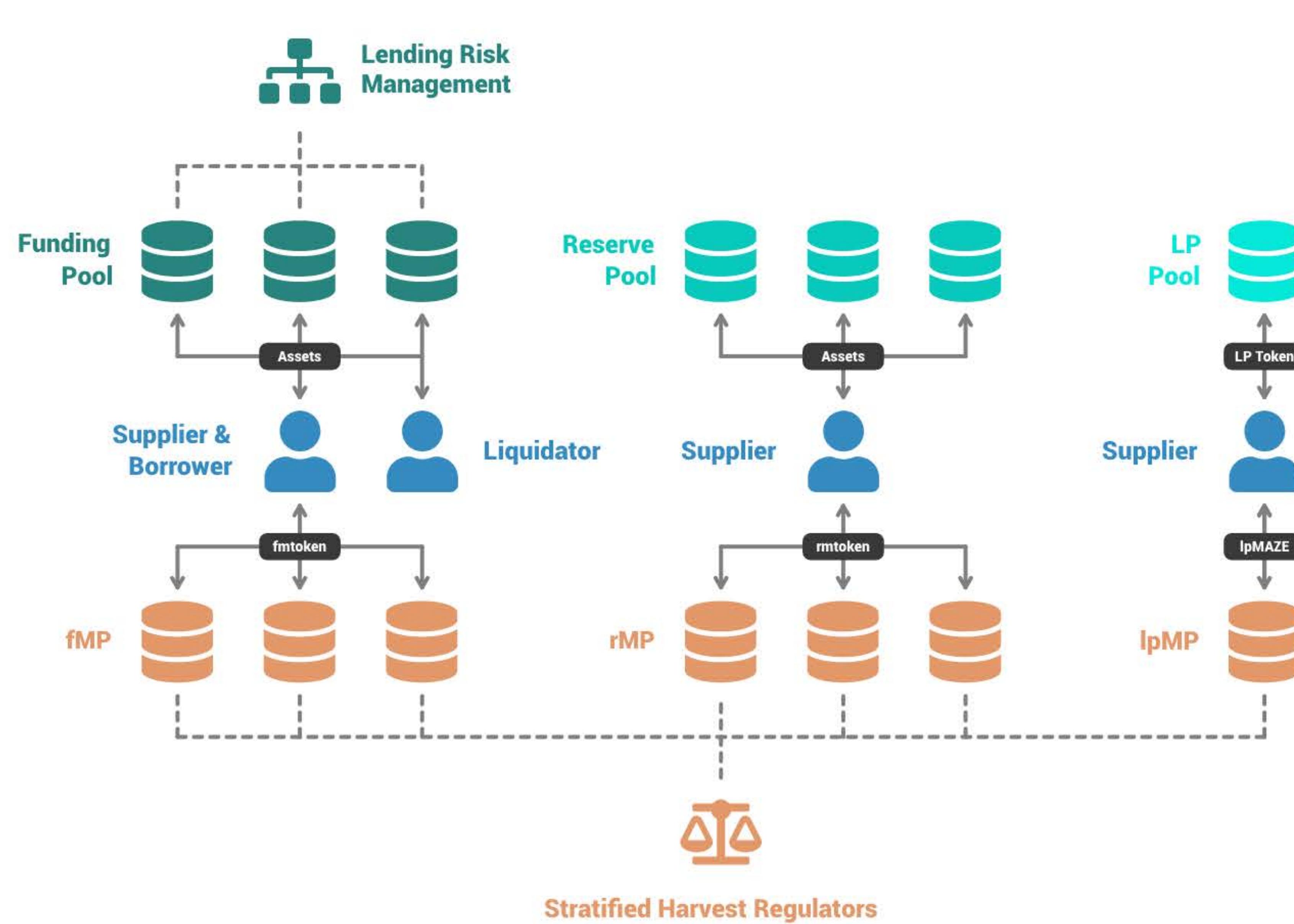
-  **Liberalized interest-rate pricing mechanism as an asset (MAZE)**
-  **Ultra low-cost and high-efficiency liquidity provision**
-  **Funding costs that can be completely fixed in the short term and close to zero in the long term**
-  **New products and services such as interest-rate instrument derivatives and exchanges**
-  **Automated and trustless universal ecosystem for zero-interest lending**
-  **Investment income that is smart, composable and unified globally**
-  **Transporting costs and adjusting liquidity of the protocol simultaneously by arbitrage markets**



# What is Maze Protocol?

Maze is the world's first decentralized, over-collateralized universal money market that allows for zero-interest lending, where lenders dedicate funds into asset pools from which borrowers can initiate loans. Maze's core objective is to establish a money market liquidity pool for various crypto assets that can be lent without interest, with suppliers earning effective interest rates synthetically provided by the native MAZE token.

Maze's core protocol is composed of smart contracts that manage a group of non-custodial asset pools in a trustless manner through the issuance of and investment in Perpetual Smart Bonds (PSB). The protocol automatically manages the issuance and settlement in these on-chain bond instruments (strip bonds in traditional finance parlance) to provide liquidity from the crypto market. The determination of these perpetual smart bonds' synthetic and adaptive interest rates relies on a newly invented Liberalized Interest-rate Pricing Instrument which is the protocol's native MAZE cryptocurrency.



The Maze core protocol is formed by a series of smart contracts located on blockchains, allowing the entire settlement of the relevant perpetual smart bonds without intermediators. When the supplier provides funds to the protocol, a strip bond is issued to the supplier at the same time, and will keep settling a special substitute of interest (MAZE) to the supplier according to the bond; when the demander acquires a loan from the protocol, the demander using the smart contract initiates a zero-coupon bond which is accepted by the protocol.

The smart bonds issued and managed by Maze are perpetual (do not have a set expiry date and interest is settled in cycles where creditors have the right to redeem principal from asset pools at any time), tokenized (separable and independently tradable assets), automated through smart contracts (no third-parties involved), and composable (recognizable and compatible with other DeFi services).

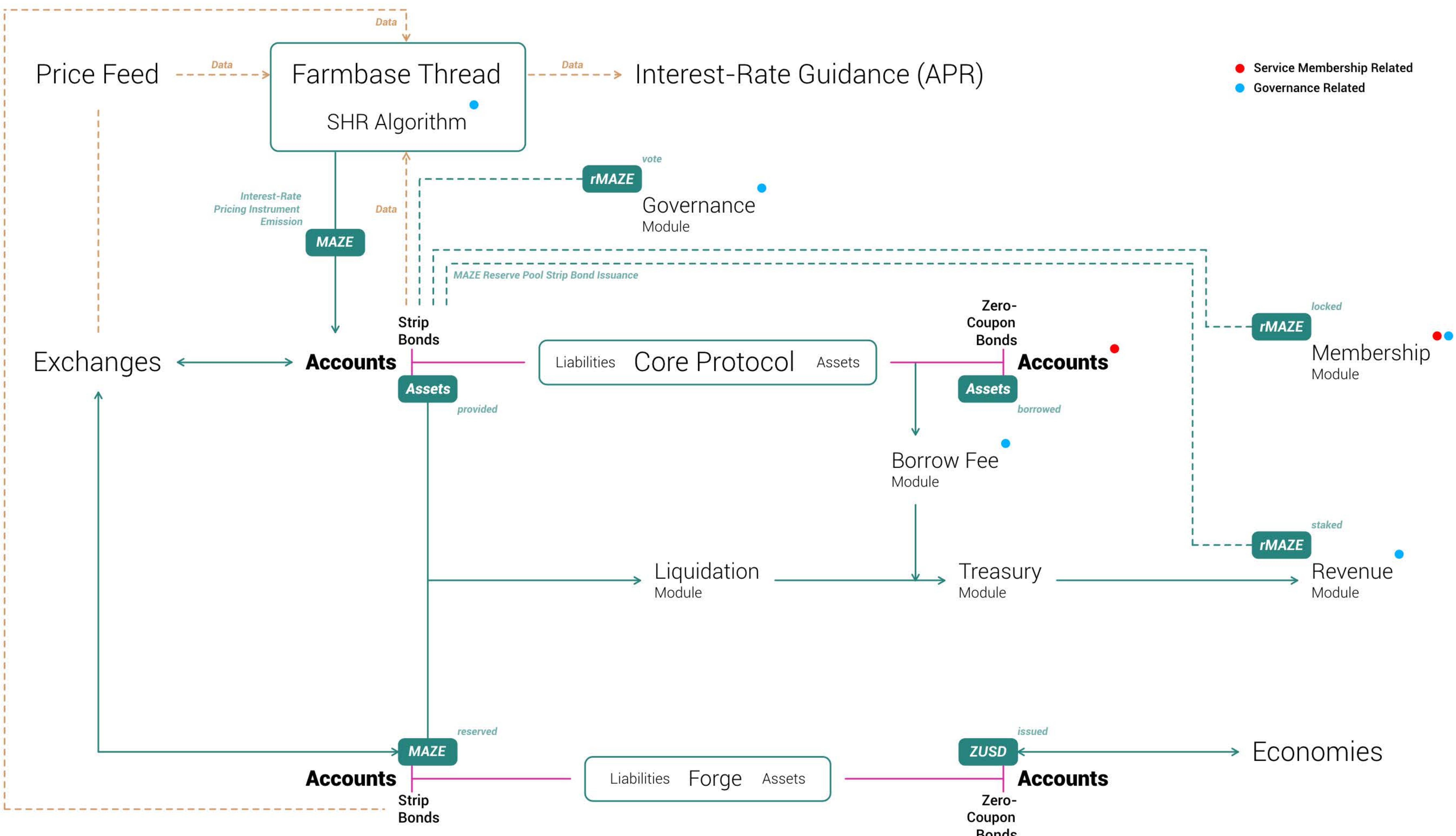
The protocol decides the MAZE allocation to strip bond investors via an innovative dynamic yield-rate consensus algorithm called Stratified Harvest Regulating (SHR), thus enabling the floating interest-rate guidance on the supply side. In the meantime, the governance module is responsible for regulating the issuing price of zero-coupon bonds from the demand side, and transmitting the protocol's gains through MAZE.

The protocol's native token, MAZE, serves the role of the liberalized interest-rate pricing mechanism as the substitute for traditional interest income received for lending. MAZE is an **interest-rate pricing instrument** as well as a programmable trading asset. Thus, the right to set the interest-rate pricing on Maze Protocol has been passed on to all the participants in the free markets, supporting arbitrage opportunities and zero-interest borrowing. The global exchange markets related to MAZE are the key to protecting the sustainability and robustness of the Maze Protocol; such liquidity is instrumental to the effectiveness of interest-rate pricing. Many paths related to the derivatives of the Instrument can turn arbitrage into the multi-party strength to power the zero-interest lending model of Maze Protocol.



# Protocol Structure

Maze Protocol consists of multiple modules which cooperate together to achieve the ultimate goal: a super-sovereign monetary protocol powered by a decentralized monetary policy tool. The diagram below illustrates the relationship of these essential modules with their functions defined.



## Core Protocol

The core protocol consists of a group of smart contracts which define asset pools, PSB procedures and risk management policies. It is an automated counter-party serving both sides on PSB issuance and investment.

## MAZE & rMAZE

MAZE, the native token, plays the role of the Interest-Rate Pricing Instrument. When clients send MAZE into MAZE Reserve Pool they will get rWMP in return which locates the residue of the MAZE strip bond.

## PSB

Perpetual Smart Bonds, token assets representing the perpetual nature of the bonds, are generated by smart contracts to define the relationship between the protocol and the clients.

## Strip Bonds

Strip bonds are a type of PSB issued via the smart contract when clients provide assets to the core protocol. The bonds will automatically generate MAZE as an interest substitute to the creditors.

## Zero-coupon Bonds

Zero-coupon bonds are a type of PSB issued via the smart contract when the loans are initiated by the debtors. The protocol collects the differential values between the issuing price and the face value of the bonds.

## Forge

The Forge is a group of smart contracts in the protocol which accepts MAZE as a reserve and mints ZUSD, the stablecoin pegged to 1 US dollar.

## Farmbase Thread

The Farmbase Thread is a transparent computation protocol to separate the massive income calculation workload from the layer-1 blockchains. The SHR algorithm is implemented on this middleware to control the allocation of MAZE to respective asset pools.

## Borrow Fee Module

The Borrow Fee Rate model programmatically sets and charges the differential values between the issuing price and the face value of each zero-coupon bond based on the occupation ratio of the asset pool.

## Membership Module

An account must lock a certain amount of rMAZE in order to obtain the membership to use the loan service. If the account has debts, the rMAZE cannot be unlocked.

## Liquidation Module

When an account's collateral value is close to the debt value, the account is likely to be liquidated. The insurance fund will actively monitor and proceed the liquidation tasks to prevent the protocol from insolvency.

## Revenue Module

The protocol annually distributes the gains accumulated in the treasury. The accounts which hold rMAZE for a certain length have the rights to share the revenue.

## Governance Module

The community's power distribution sector uses rMAZE as the voting right.



# Product Framework

According to the different functions, the Maze application suite is divided into several products:

## Maze Core

Maze Core dApp provides the core functions of the money market: supply, loans and liquidation.

### Creditor

The creditor funds the asset pools to invest in the strip bonds. The Reserve Pools generate cross-chain drawing rights while the Funding Pools generate local-chain borrow credits. Both pool types generate the passive income MAZE.

### Debtor

The debtor gets funded by issuing zero-coupon bonds to the protocol. The debtor must maintain a certain quantity of rMAZE (preset at 10) while using the loan service. The borrow fee on the zero-coupon bonds belongs to the Treasury.

### Liquidator

The liquidator can repay the loan and earn the collateral in return when liquidating an unhealthy account. The liquidator may need to maintain a certain quantity of rMAZE. A part of the liquidation penalty belongs to the Treasury.

## Maze Council

Maze Council dApp provides the supportive functions of the money market: data analysis, governance and revenue sharing.

### Dashboard

The dashboard provides statistical services on the global status of the money market.

### Governance

Any account can initiate a proposal or vote for one with the rMAZE balance that reaches the requirement.

### Finance

The Finance Department annually collects the protocol income from the Treasury and distributes the gains to the accounts which hold rMAZE in the long term.

## Maze Forge

Maze Forge dApp provides the premium functions of the money market: to forge and melt ZUSD.

### Forge & Melt ZUSD

The client funds the Forge Pool to invest in the strip bonds and get the forge credit. ZUSD loans operate based on the zero-coupon bond. The protocol recycles 1 ZUSD at a value of 1 USD at any moment and releases the MAZE collateral.

### ZUSD Liquidator

The liquidator can repay ZUSD and earn the MAZE collateral in return when liquidating an unhealthy account in the Forge Pool. The liquidator may need to maintain a certain quantity of rMAZE. A part of the liquidation penalty belongs to the Treasury.

## Maze Terminal

Maze Terminal dApp provides the cross-chain drawing right transfer ability based on the Reserve Pool liquidity, and the atomic migration service of the MAZE token.

### Departure

The Departure Terminal locks and burns the delegation token pair (or MAZE) and reports the cross-chain transfer order. If multiple arrival addresses are needed to hide the trace, more fees will be charged (belong to the Treasury).

### Arrival

The Arrival Terminal receives the cross-chain transfer order to mint and release the delegation token pair on the arrival chain.

## Farmbase Scan

Farmbase Scan provides advanced analysis services and the search engines for every Maze account to look up transactions on the middleware.

# MAZE Token: Interest-Rate Pricing Instrument

The interest spread system is the most widely used model in money markets, where it continuously transmits funding costs of debtors to creditors, and utilizes the interest-rate pricing mechanisms to adjust the liquidity of each asset. In the current DeFi area, the common lending protocols mostly simulate the Prime Rate Spread model in smart contracts, which is suitable for classical interest spread systems. However, in terms of the Maze core protocol, as its demand side issues PSBs which are zero-coupon bonds, the actual interest rates are unlikely to be determined on that side. In this situation, the protocol must use an alternative interest-rate pricing solution. Considering the unique potentials of crypto economies, an interest-rate pricing instrument which allows long-term zero-coupon status on the demand side has been developed.

The protocol's native token MAZE is a Liberalized Interest-Rate Pricing Instrument whose nature has determined its indispensable position in the protocol. Since it is the sole income of strip bonds, MAZE is the virtual interest-rate guidance for suppliers on the protocol. With prices fed by an oracle, MAZE can provide interest-rate guidance for any asset integrated by the protocol. When using MAZE as the interest rate guidance for an asset, it is suggested to confirm a popular benchmark currency as the unified measure for interest-rate computation, e.g. US dollar. If all of the asset pools are considered as a whole, the average interest rate of the entire protocol's supply side can be calculated.

$$I_{Supply} = Y_{MAZE} * P_{MAZE} / V_{Protocol}$$

$I_{Supply}$	<i>The average interest rate of the protocol (the benchmark rate)</i>
$Y_{MAZE}$	<i>The annual yield prediction of MAZE in total</i>
$P_{MAZE}$	<i>The price feed of MAZE in USD</i>
$V_{Protocol}$	<i>The value of all the asset pools</i>

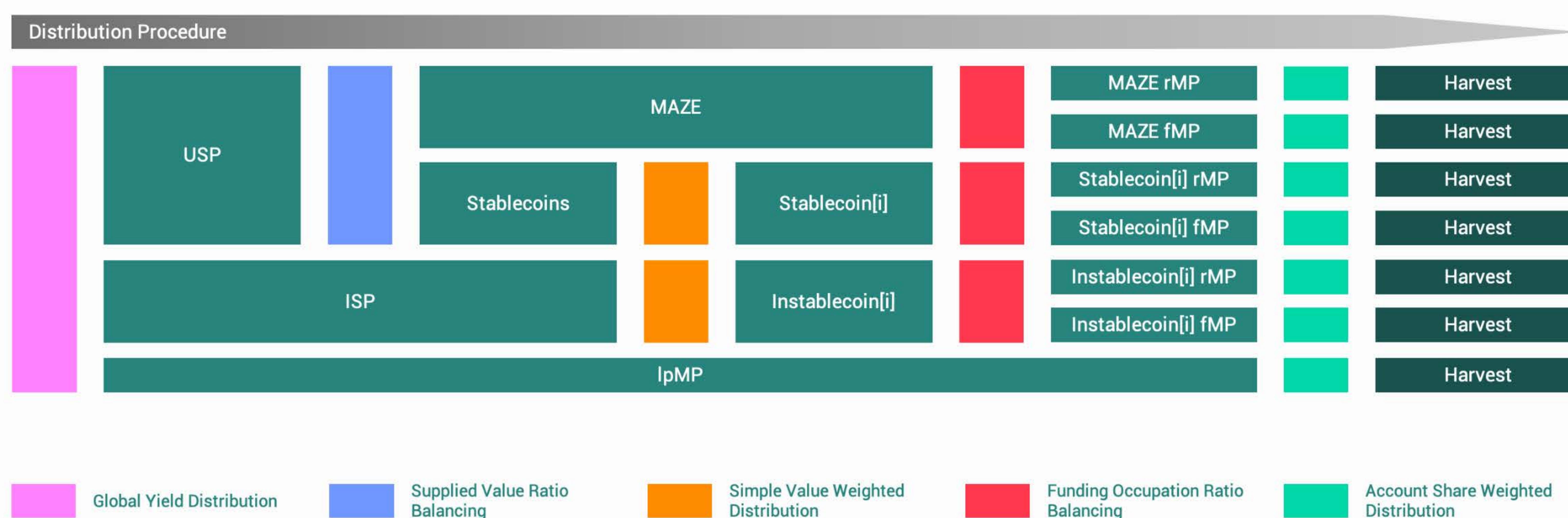
Based on this simple fact, MAZE becomes the substantialization of interest rates. All trade parties who purchase or sell MAZE have the power to change the MAZE price, thus influencing the interest rate on the protocol, which would not require any governance procedures. When the capital market overheats, the demand on the Instrument rises, enhancing the liquidity of the protocol, and the smart traders liquidate their Instrument before the end of the cycle; when the capital market overcools, the demand on the Instrument drops, shrinking the liquidity of the protocol, and the smart traders recycle their Instrument before the start of a new cycle. From the angle of profit pursuit on liberal markets, the price discovery of the Instrument is made by the traders' expectation on the future development of the capital market, bringing the protocol a tidal nature that sticks with the capital market cycles – this is the fundamental concept behind the Liberalized Interest-Rate Pricing Instrument.

# Stratified Harvest Regulating (SHR)

Since the Protocol does not extract interest from the demand side, there must be a new algorithm able to incentivize liquidity injection solely on the supply side and also cover the adjustability inherent in the traditional interest-rate pricing models. Given that MAZE is the sole income of strip bonds, the new algorithm is actually a guarantee of the effective MAZE allocation in respective asset pools, which ensures the legitimacy of the interest-rate guidance.

Maze Protocol relies on a unique master issuance algorithm for MAZE called Stratified Harvest Regulating (SHR). SHR is implemented through Farmbase smart contracts and allocates MAZE to different asset pools through well-defined rules based on the asset pools' price feeds and supply-demand status adaptively. The sharing of Maze ecosystem's revenue is the cornerstone of the value of the protocol. The mechanism ensures that the demand side's costs of borrowing along with other protocol revenues will be transmitted to the supply side. When the protocol has a prosperous trend, the trading activities in the asset pools will be more frequent and the market's high fluctuation and leverage will intensify the liquidation, which in turn raises the protocol gains. SHR Generation is the MAZE yield on the protocol, which is a perpetual incentive for all the asset suppliers. The yield is strictly generated and allocated by SHR.

*The Visualization of the SHR Algorithm*



SHR ensures the stability of MAZE emission, making the total yield generation at a given time a certainty. The design of the cycle is equivalent to unifying the interest settlement intervals of strip bonds to 10 minutes, which is the minimum interval at which interest-rate repricing takes place.

To learn more about SHR, please read the whitepaper.

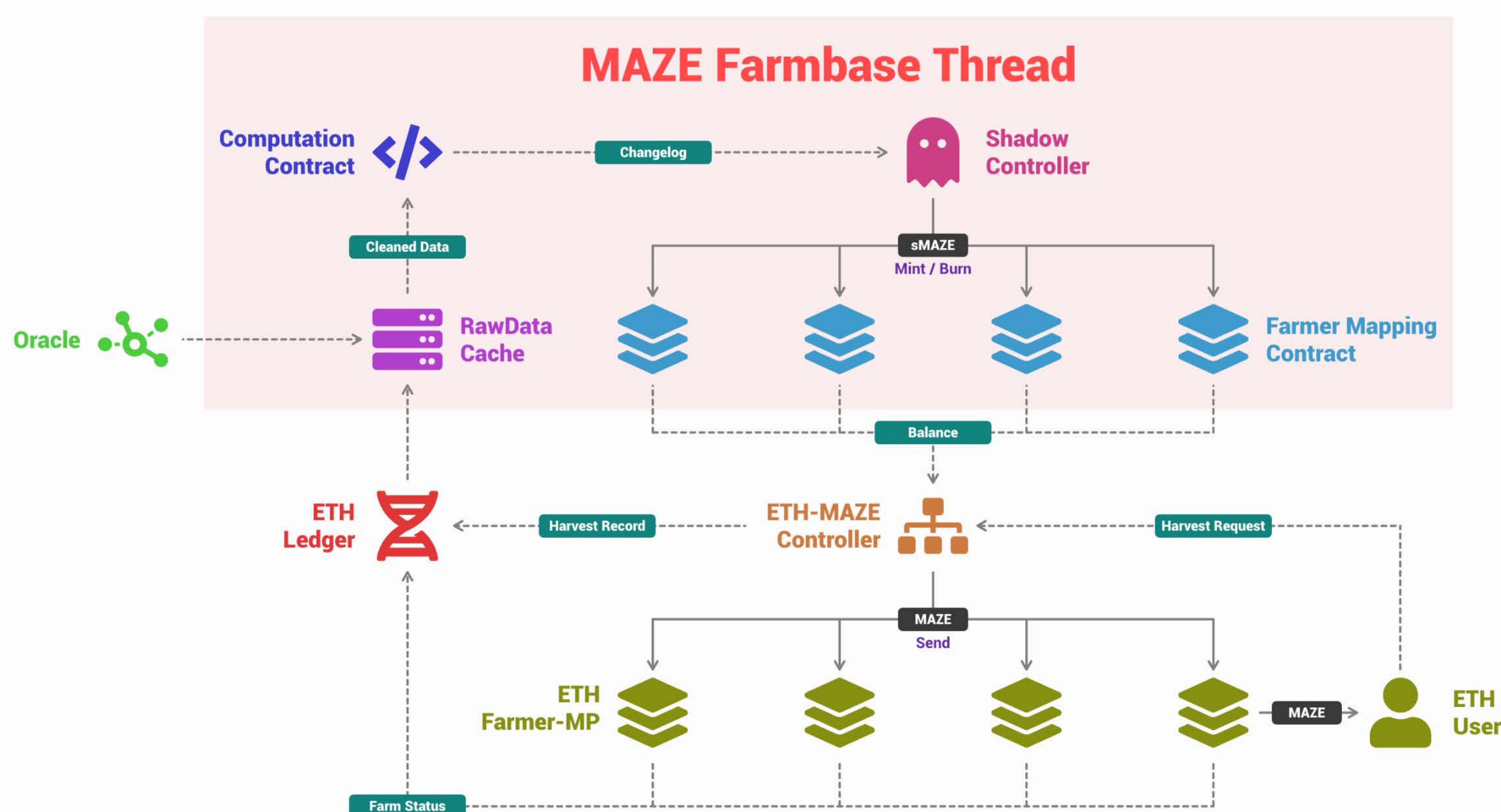
Find the Maze whitepaper in <https://github.com/maze-protocol-official/documentation>



# Farmbase Middleware

Due to the massive income computation workload required by the Stratified Harvest Regulating algorithm, which overwhelms layer-1 blockchain networks with the massive computation and transaction volume pressure, Maze Protocol is integrated with a proprietary transparent computation middleware called Farmbase Protocol. Farmbase is a universal blockchain framework developed independently by the Maze team. It migrates the settlement mission of perpetual zero-interest smart bonds out of the Layer-1 networks in order to ensure scalability while maintaining decentralization security, thereby making dynamic liquidity mining possible. Farmbase also converges different blockchains' Maze branches into a single logical network and therefore supports the cross-chain synchronization of interest-rates.

Farmbase is a transparent computational layer, compatible with multiple blockchains. Each project can flexibly establish its own dedicated Farmbase instance as the dedicated layer for computationally intensive applications. Maze Protocol has its own Farmbase instance working in the way illustrated below:




Using Farmbase to merge the liquidity mining shares of cross-chained identical assets is very simple – one only has to accept multiple ledgers, and then to add the pool balances together when the whole share is calculated. Maze uses such a way to merge the shares embedded on all blockchains. No matter how many networks are expanded upon, only one SHR is needed, and all networks share the same economy driven by one MAZE token.

The Farmbase framework also has the ability to generate other forms of middleware including cross-chain transfer protocols and price-feed oracles. For example, Maze Terminal is implemented by a mutated instance called Farmbase Hawala Thread.

# Roadmap & Milestones

The Maze team was founded in 2016 as a blockchain infrastructure technology company. Since then, a comprehensive blockchain framework has been developed, which set the foundations for creating Maze.



# Mazenomics

According to the design of the Stratified Harvest Regulating (SHR) algorithm, the native token MAZE does not have a fixed supply cap. The total supply of MAZE consists of two parts: Genesis Generation and Farming Generation.

<b>Genesis Generation</b>	<b>%</b>	<b>Tokens</b>	<b>Raise Price</b>	<b>Total Raise</b>	<b>Y1 Valuation</b>	<b>TGE Unlock</b>	<b>Vesting Schedule</b>
Foundation	13.64%	3,000,000					12 months cliff, monthly over 3 years.
Marketing	1.36%	300,000					Monthly over 1 year.
Advisors & Partners	3.36%	740,000					12 months cliff, monthly over 2 years.
Team	10.00%	2,200,000					12 months cliff, monthly over 2 years.
Angel Round Sale	3.64%	800,000	\$0.50	\$400,000.00	\$11,000,000.00	10.00%	Quarterly over 2 years. <span style="color:red">Closed</span>
Pre-seed Round Sale	4.55%	1,000,000	\$1.00	\$1,000,000.00	\$22,000,000.00	10.00%	Quarterly over 1 year.
Seed Round Sale	4.55%	1,000,000	\$2.00	\$2,000,000.00	\$44,000,000.00	15.00%	Quarterly over 1 year.
Strategic Round Sale	2.27%	500,000	\$4.00	\$2,000,000.00	\$88,000,000.00	20.00%	Quarterly over 1 year.
Private Round Sale	2.27%	500,000	\$8.00	\$4,000,000.00	\$176,000,000.00	30.00%	Monthly over 6 months.
Public Offering	1.64%	360,000					Based on the events.
		10,400,000		\$9,400,000.00			

<b>Farming Generation</b>	<b>Y1 Period</b>	<b>Emission Rate</b>	<b>Emission</b>
Initial Emission Rate	1-84	72,000	6,048,000
Cutdown Interval	85-168	36,000	3,024,000
Cutdown Target Rate	168-252	18,000	1,512,000
Y1 Max Supply	252-365	9,000	1,017,000
Generation Rate From Y2			

## MAZE Utility on Core Protocol

MAZE can be deposited into its Reserve Pool or Funding Pool. To the Funding Pool and the Forge Pool, MAZE can be used as a collateral and generate income. To the Reserve Pool, rMAZE will play multiple roles while rmMAZE will also bring farming revenue. The picture below intuitively exhibits how to use MAZE in the Maze core protocol.

