DeFiYearn

Protocol White Paper

Version I

DefiYearn Team

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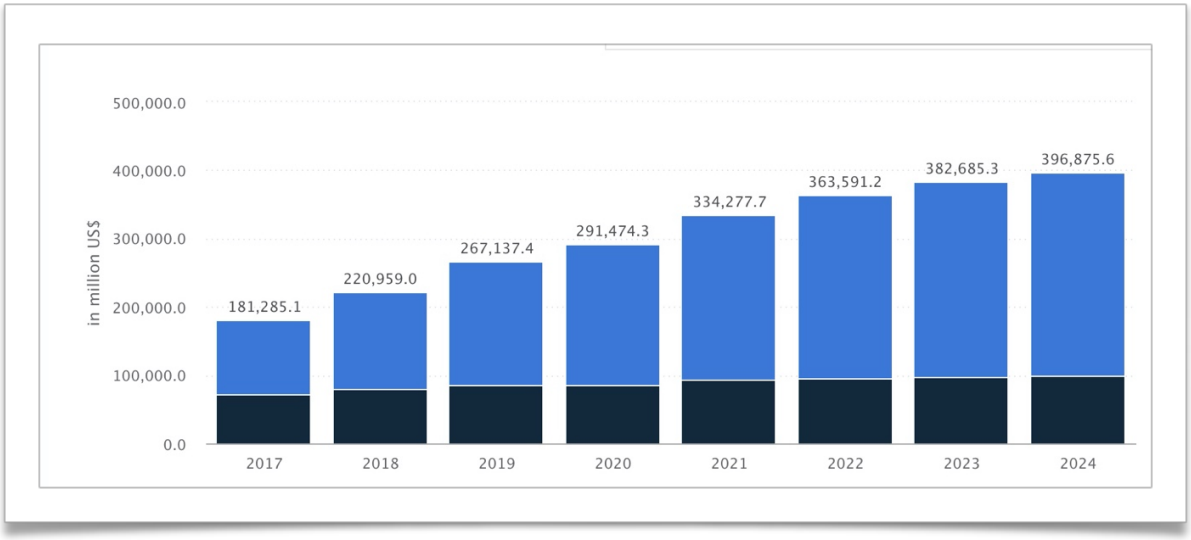
Introduction

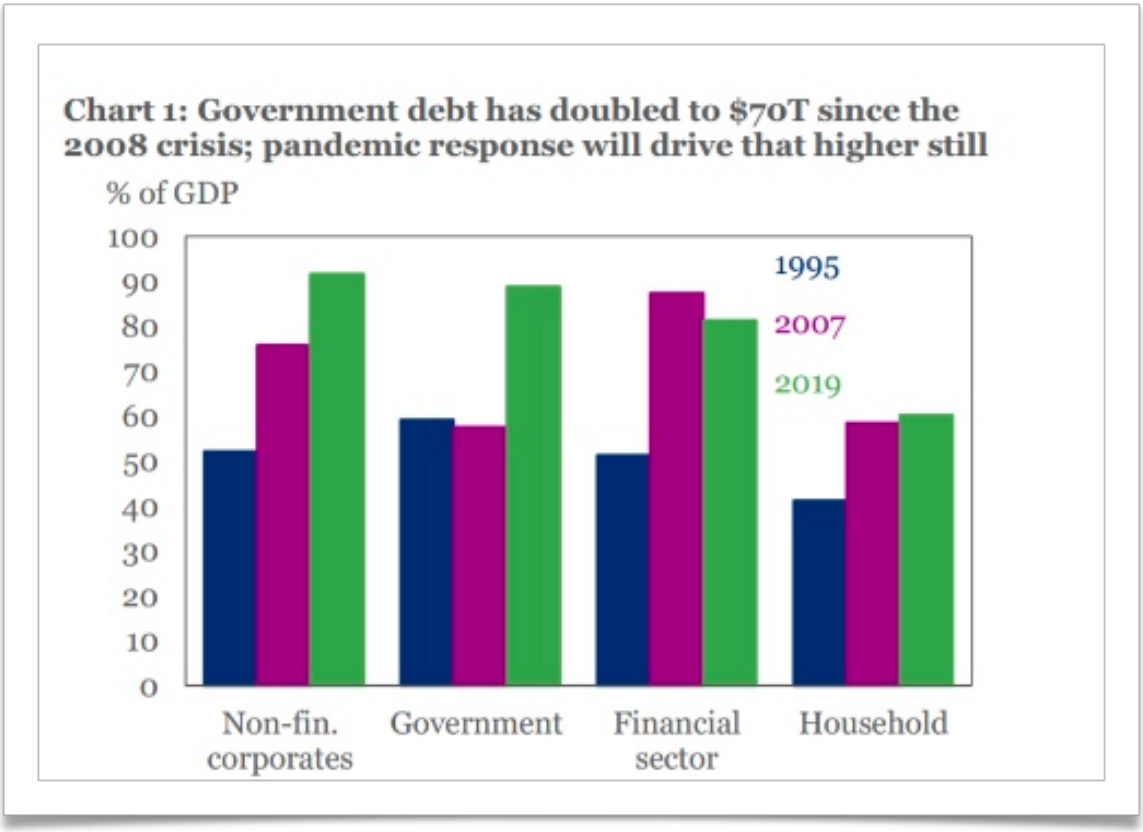
According to Statista data in 2020, the total global lending transaction volume is expected to reach US$29194.743 billion, and the total transaction volume is expected to reach US$396.76 billion by 2024. The global lending market is expanding. At present, the Indian private loan market is expected to be around 10% per year. The growth is at an alarming rate. Declining income and increasing expenditures, as well as the popularity of consumer finance in recent years, are key factors driving the gradual rise of the Indian personal loan market. In addition, it is often difficult for ordinary people in India to obtain personal credit. The reasons for rejection are often to be, for instance, lack of credit history, unquantifiable risks, out of business coverage, etc. Less than 15% of the population has access to credit services from the formal banking sector; the rest obtain informal credit through relatives, friends, business partners, or lenders. In addition, such transactions mainly take place in the form of cash, and there is no reliable documentary evidence. Once overdue or being involved in a dispute occurs, the borrower and lender have almost no right of recourse.



In the traditional financial system, most credits are given to relatively higher-class groups of people with risk levels above prime and prime. Whether it is bank card issuance or unsecured instalment loans, they basically focus on a relatively high-

quality customer base. For relatively subprime, or poorer people, banks will basically not consider them.

According to the statistics provided by the World Bank, as of 2020, there are 2 billion people who do not hold accounts with financial institutions, and more than half of them are from developing countries. They mainly come from poor families. The main reasons why they do not have a bank account include poverty, geographic location and trust issues. For the 2 billion people without bank accounts, access to banking services is very difficulties. The unfairness of traditional finance is gradually making new changes in the world. After the 2008 financial crisis, Satoshi Nakamoto proposed Bitcoin to try to change the traditional financial issues such as currency issuance and currency inflation. Technology changes the world. Perhaps in the future, it is also the era of financial technology. With the development of blockchain technology, decentralized financial (DeFi) is now born, a borderless, censorship-free and barrier-free financial product. The DeFi agreement will not discriminate against anyone and will create a fair environment for everyone to participate.



Why will decentralized finance become more important in 2020? Globally this year, the acceleration in debt levels occurred before the financial crisis, this is triggered by Covid-19. According to data from the International Finance Association (IIF), the current global sovereign debt issuance reached 2.1 trillion in March, a double increase from the 2019-2019 period. Prior to this, global debt increased by US$10 trillion in 2019, reaching US$255 trillion, 322% of global GDP. IIF said that if the global economy is affected by the new crown epidemic in 2020 and the global economy shrinks by 3%, and the global sovereign debt level may continue to expand to twice that of 2019, it means that the future debt level will be 342% of GDP.

The Federal Reserve Board even hinted that they have an unlimited money supply, and the euphemistic "unrestricted issuance of currency into the mainstream" has also become a mainstream vocabulary. Obviously, these numbers may increase and the issuance of debt to GDP will continue to accelerate. Unlimited additional currency issuance and asset devaluation. Before the financial crisis, how we need to protect our assets from devaluation may be something everyone is paying attention to recently, so it reflects the advantages of decentralized finance and digital currency. Additional issuance will not cause currency inflation. At the same time, it is linked to the world's largest currency settlement system, the US dollar, with a 1:1 conversion ratio. Therefore, digital currency and DeFi can still make your assets not depreciate while gaining benefits.

1. Background

1.1 What is Finance?

- Finance refers to the separation of transactions and circulation of gold, that is, price negotiation, which means that in economic life, banks, securities or insurance companies raise funds from financial market entities (such as

depositors, securities investors, or insurers, etc.) and borrow Economic activities for other market players.

- Broadly speaking, all capital flows generated by government, individuals, organizations and other market entities through raising, allocating and using funds can be called finance. Therefore, not only the financial industry, but also the government's finances, the behaviour of industry enterprises, and personal financial management are all part of finance. Finance can be regarded as three types of economic activities: fund raising allocation (funding), and investment and financing (borrowing money to buy stocks).

1.2 What is Decentralised Finance?

Decentralized Finance, DeFi is the abbreviation of this phrase, if the literal translation is "decentralized finance". But in fact, it is more appropriate to call it "distributed finance" or "open finance". It generally refers to encrypted assets, financial smart contracts, and agreements based on smart contract platforms (such as Ethereum). These assets, smart contracts, and agreements can be combined like Lego, so they are also called "currency Lego."

Compared with the traditional centralized financial system, DeFi has three advantages:

- Individuals with asset management needs do not need to trust any intermediary agency to rebuild new trust on the machine and code;
- Everyone has access rights and no one has central control rights;
- All agreements are open source, so anyone can cooperate on the agreement to build new financial products and accelerate financial innovation under the effect of the network.

DeFi refers to the aggregation of a series of financial services, such as transactions, loans, borrowing, and payments. These services rely on decentralized infrastructure to operate in the form of blockchain networks and smart contracts.

1.3 Traditional Finance VS. Decentralised Finance

	Defi dApps	Traditional Finance Services
Management	Unlike traditional financial services, defi dapps are not managed or controlled by anyone. Instead, these applications use smart contracts and blockchain technology to run without (or very little) human intervention.	Every traditional financial service is managed and screened by an organization or institution (such as a bank). So, these services are centralized in nature.
Access Permission	Anyone in the world who has a device with corresponding functions and an active Internet connection can access and use DeFi dApps.	Under the jurisdiction of local regulations, user access rights are determined by the service provider. Certain financial services (such as loans) are only available in certain countries or regions. In addition, you must know that there are still about 2 billion people in the world without bank accounts.
Transparency	Very high. DeFi dApps are owned by Open sourced. Its code is published on the blockchain and anyone can review it. Anyone can check all trading activities.	Lower. Unless otherwise required by regulations, traditional providers are generally reluctant to share information about their products and services with the public.
Level of Interoperability	Very high. Most DeFi dApps are built in ways that are compatible with other products (for example, stable coins, decentralized exchanges, loan services).	Lower. Although a certain service provider combines its services with free products, but does not integrate with the financial products of other organizations.
User Experience	Flexible, if you don't like the interface of the DeFi application, you can use a third-party platform or even customize the interface.	Standard. The interface that the service provider originally built for the application must be used.

1.4 What are the advantages of DeFi?

Cryptocurrency lending has some advantages for lenders and borrowers over traditional mortgage lending.

For lenders:

a. Due to the widespread use of over-collateralization and the collateral is often the mainstream currency with excellent liquidity on the market, the credit risk borne by lenders is minimal.
b. The price is transparent, and the fair value of the pledge can be obtained at any time.
c. The cost of storing pledges is relatively low, mainly to ensure the security of digital assets.
d. The price fluctuates to a dangerous range, and the position can be liquidated at any time. Compared with collateral such as automobiles, the disposal cost of mainstream digital currencies is extremely low.
e. The monitoring and disposal of IOUs can be fully automated. After the system is set up, the additional marginal management costs brought by the growth of the borrowing scale are extremely low.
f. There is almost no need for credit qualification review, which can save this cost.
g. Compared with using cars as pledges, digital currencies are not only possible to depreciate. The room for the appreciation of pledges further reduces the risk of lenders.
h. It is possible to lend to users around the world, unlike traditional lending which is usually only available to domestic users.

For borrowers:

a. Since credit qualification review is not required, the threshold for obtaining loans is lowered.
b. Liquidity can be obtained quickly, and traditional lending approval is often slower.

c. For some users who are difficult to obtain low-interest loans through traditional channels, cryptocurrency lending has played a role in inclusive finance.
d. Cryptocurrency lending can better empower companies and individuals in the cryptocurrency ecosystem (exchanges, project parties, crypto investment institutions, etc.), help these entities obtain the required liquidity, and integrate them into the closed business loop to enhance their asset management capabilities.
e. The liquidity obtained by borrowing is different from the direct sale of digital currency, and there is no need to pay capital gains tax.

1.5 The trend of decentralized finance

Decentralized finance (DeFi) has achieved significant growth in the past year. As of the end of August 2020, the total value of DeFi exceeds US$8.05 billion, and most applications are deployed on the Ethereum blockchain. The rapid rise of DeFi has made the Ethereum ecosystem more perfect, and at the same time it has brought more liquidity to the digital currency, and at the same time made digital assets more currency attributes. From financial attributes to financial assets, DeFi has given the blockchain more possibilities. The generation of many DeFi and the continuous improvement of liquidity agreements will also have certain thresholds for new users entering the market in the future. How to use DeFi to protect their assets in the future devaluation and obtaining greater benefits on DeFi may become the future trend. Therefore, DeFiYearn Protocol was born, a platform focusing on the aggregation of liquidity mining protocols.

2. DeFiYearn

2.1 What is DeFiYearn?

DeFiYearn is a DeFi aggregation liquidity mining protocol. It integrates APIs of multiple products to form the DeFiYear SDK. The main function is to compare the POS liquidity mining models that have been generated on the VM and use DFY.

LH-ROI volatility strategy [see 4.2DFY LR-ROI volatility strategy below for details] calculate the product portfolio with high liquidity and high return into the SDK.

2.2 What are the advantages of DeFiYearn?

- Save user operating time, enter and exit the liquidity pool with one click.
- Reduce handling fees caused by exchange rate differences when users proceed mortgage or borrow.
- Multi-platform integrated SDK (Uniswap, Curve Finance and Balancer, Opyn, Shell Protocol, etc.), to choose multiple high liquidity.
- Visually track the asset trends of major DeFi players in real time and keep up with the market.

2.3 Direct comparison between DeFiYearn and DeFi

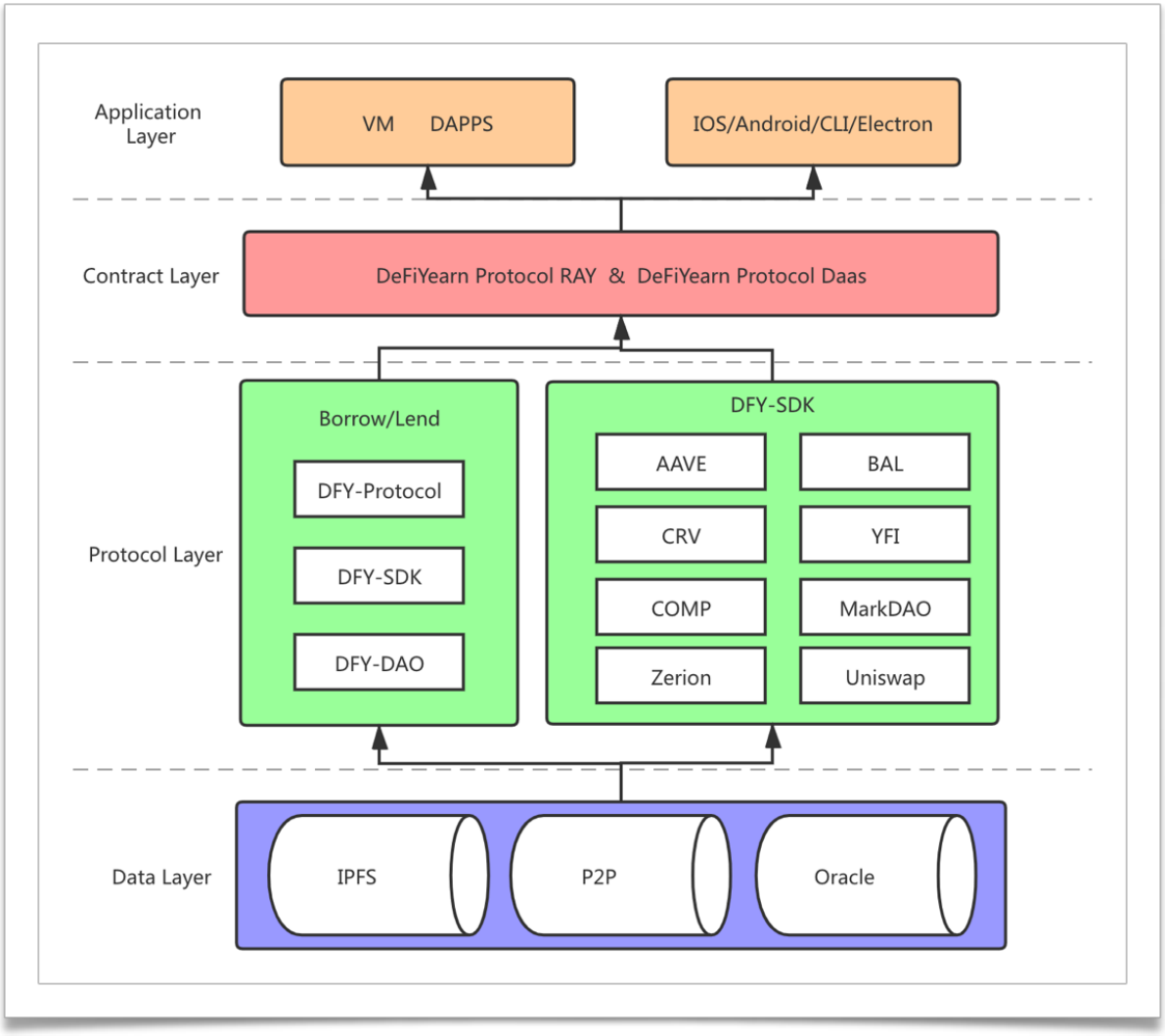
DeFiYearn VS DeFi					
	LP	Platform	Deposit Rates	Whale Tracking	Operation
DeFi	Single choice	Web-client	HIGH	No	Slow
DeFiYearn	DFY-SDK	Multi-client	LOW	YES	Fast

2.4 The future of DeFiYearn

By aggregating a series of DeFi protocols, DeFiYearn Protocol will form a strong network effect in the blockchain finance field in the future. Based on the blockchain, we can create better currencies, better banks, safer lending platforms, and a better future, so that anyone in the world can enjoy the security and convenience brought by digital currency at anytime, from anywhere.

Our goal is to become the first global-scale, integrated decentralized convergent financial network portal.

3. DeFiYearn Protocol RAY



3.1 What is Yearn-RAY?

RAY (Robo Advisor for Yield) is a smart contract system that can automatically allocate funds based on income opportunities. After investors deposit assets, the system will automatically monitor each DeFi contract and automatically allocate assets to contracts with the best real-time returns.

For example, suppose that one million yuan worth of Dai in the current fund pool is stored in Compound. At this time, Dai's interest rate is 5%. After a period of time, the increase in Dai's borrowing demand in dYdX led to the increase of Dai's

deposit interest rate to 10%, and RAY will automatically allocate (part of) funds to the dYdX platform so that the entire fund pool can obtain the best return.

Yearn-RAY simply means that the DeFiYearn Protocol platform provides such a RAY service to help investors quickly and automatically find high-yield opportunities, just like Yearn’s meaning: “DeFiYearn is exact platform that the DeFi aggregation that users yearn for and look forward to".

3.2 What are the agreements which DeFiYearn docked?

At present, DeFiYearn has docked with the basic AMM, RAY, VAULT, UMA, APR and other agreements. It is precisely because of the diversified launch of the agreement that the platform will be more complete. At the same time, it will also allow investors not to pay attention to interest rates at all times, constantly observe and operate quickly to allocate funds in order to obtain higher returns. With the DeFiYearn Protocol, everything will become more and more simple, just like the original intention when DeFiYearn was established, to create a simple, convenient and high-yield one-stop DeFi protocol platform, DeFiYearn will access more protocols in the future to improve its own SDK and adapt to the market, making DeFi less difficult.

3.3 DeFiYearn Framework Architecture

The DeFiYearn architecture is divided into 4 layers, which are application layer, contract layer, protocol layer, and data layer.

1. Application layer:
   Mainly provide users with visual clients, including web version Dapp, IOS, Android, Linux/macos CLI command line operation, Electron development and packaging Windows/Macos and other clients
2. Contract layer:
   The main function of the contract layer is to interact with VMs, as well as to provide basic excuses and scalable models for contract interactions between DeFi, stable coins, insurance and other derivative functions.

3. Protocol layer:

   The protocol layer is the core function of DeFiYearn. The main function is to provide interactions between DeFi protocols, filter out liquidity, Pos rights, and handling fees that are reasonable agreements, and then combine with Oracle to finally form the core SDK of DeFiYearn. In this basket After the protocol set function of DFY, the contract is generated and provided to the application layer for users to use. At the same time, DeFiYearn provides SDK for other DeFi platforms to use, so as to increase the liquidity of DFY.

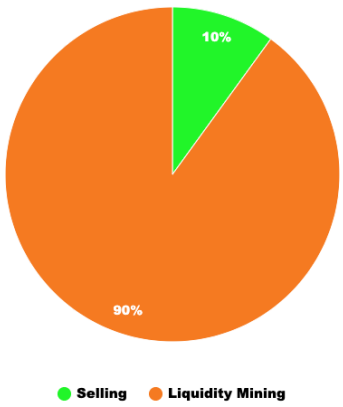
   Another function of the protocol layer is DAO governance. The main function of DAO governance is the rights and interests that DeFiYearn CDP users can enjoy, such as protocol proposal, DeFiYearn protocol addition/ delete/upgrade, coinage, etc.

4. Data layer:

   The data layer mainly stores some underlying data and the formation of the network. Here, the P2P network of Ethereum is used, combined with the Chainlink Oracle function to provide more reliable data to the protocol layer, forming a completer and more reliable DeFiYearn SDK data collection.

4. Token Economy

- Total Token: 210 million
- Token name: DeFiYearn Protocol
- Token abbreviation: DFY



4.1 DFY distribution ratio:

- 10% fundraising, pre-operation promotion and MDP version development
- Aggregate liquidity mining output 90%
- 85% to users who hold DFY
- 15% to developers and operations team

DFY is the platform currency of DeFiYearn Protocol, similar to YFI of Yearn finance and COMP of Compound, but its functions are not limited to governance and payment of interest expenses. Mainly used for:

* Transaction
* Governance voting
* Aggregate liquidity mining
* Mortgage dividend
* Mortgage synthetic assets
* Auction casting
* Operation cooperation

The DeFiYearn Protocol token DFY will continue to capture the value generated by these DeFi protocols. DFY holders will continue to receive dividends from agreement fees, DAO governance rights, etc.

Dividends are automatically executed through smart contracts, so that every DFY holder can fairly share the dividends of the continuous development of DeFiYearn Protocol.

With DFY shares, you can join the DeFiYearn Protocol community and have the right to participate in some key governance and future development of DeFiYearn Protocol.

4. 2 How to get DYF Token?

- When users use the DeFiYearn platform, they will get the corresponding dToken by mortgage, lending, minting and other operations to provide liquidity to the platform. Any dToken generation is generated through the mortgage of the underlying currency. For example, when DAI is used to provide liquidity, The corresponding aDAI or DAI will be used to generate the corresponding dDAI. The formula for generating LP is as follows:

$$c_1 = \frac{(1 + \mathrm{x}_1) * \mathrm{y}_1}{\mathrm{z}_1}$$

- where x1 is the cost required to generate liquidity dToken, y1 is the balance of smart contract tokens to be manufactured, z1 is the current total circulation of dToken, c1 is the cost required to generate a single liquidity, so there will also be c2,c3,c4... cn

- Since DFY is provided by multiple liquidity suppliers generated during balance, we get:

$$S = \sum_{i=1}^{n} i^c n$$

, S is the collection of expenses incurred by the current one-time liquidity, and this calculation aims to save users in handling fees.

4.3 How DFY guarantees no inflation?

- Ensuring sufficient liquidity and frequency of use can guarantee the income and expansion of DFY to a certain extent. The DFY income generated when users use coinage and DAO voting will be permanently

destroyed by the system. Every proposal and coinage are the current 0.3% of all proposals or votes.

- The DeFiYearn platform provides available third-party platforms for other DeFi platforms to access. If the connected platform uses sDFY, it will increase the liquidity of DFY and maintain deflation and liquidity.

4.4 DFY economic model

- DeFiYearn LR-ROI volatility strategy: LR-ROI is based on Markowitz' s portfolio theory, combined with the risk-free interest rate return given by current DeFi products, and finally forms a set of risk-free asset portfolios after calculation, and returns.

  The rate is the highest, as defined below.

  First define a utility function for the LP fund pool:

$$U = E\left(\mathrm{r}_c\right) + A\sigma_c^2$$

  , rc and $A\sigma_c^2$ represent the rate of return of a single DeFi protocol for liquidity mining. Therefore, we essentially want to maximize U revenue. Now that we know the return index of each DeFi [index return 5.7], we can invest CDP's asset y in risky assets, and invest part (1-y) in risk-free assets, so we can get the investment portfolio. The expected rate of return and standard deviation are:

$$E\left(\mathrm{r}_c\right) = yE\left(\mathrm{r}_p\right) + (1-y)\,\mathrm{r}_f$$

  Among them, rp is the return rate of the low-risk asset portfolio, and rf is the risk-free interest rate. That is, the rate of return of risk-free assets.

Then we will get:

$$\sigma_c = y\sigma_p$$

, based on this formula, we can find that if the utility is to be maximized, the partial derivative of U with respect to y must be 0, then:

$$E\left(\mathrm{r}_p\right) - \mathrm{r}_f - Ay\sigma_p^2 = 0$$

, the finalised formula is:

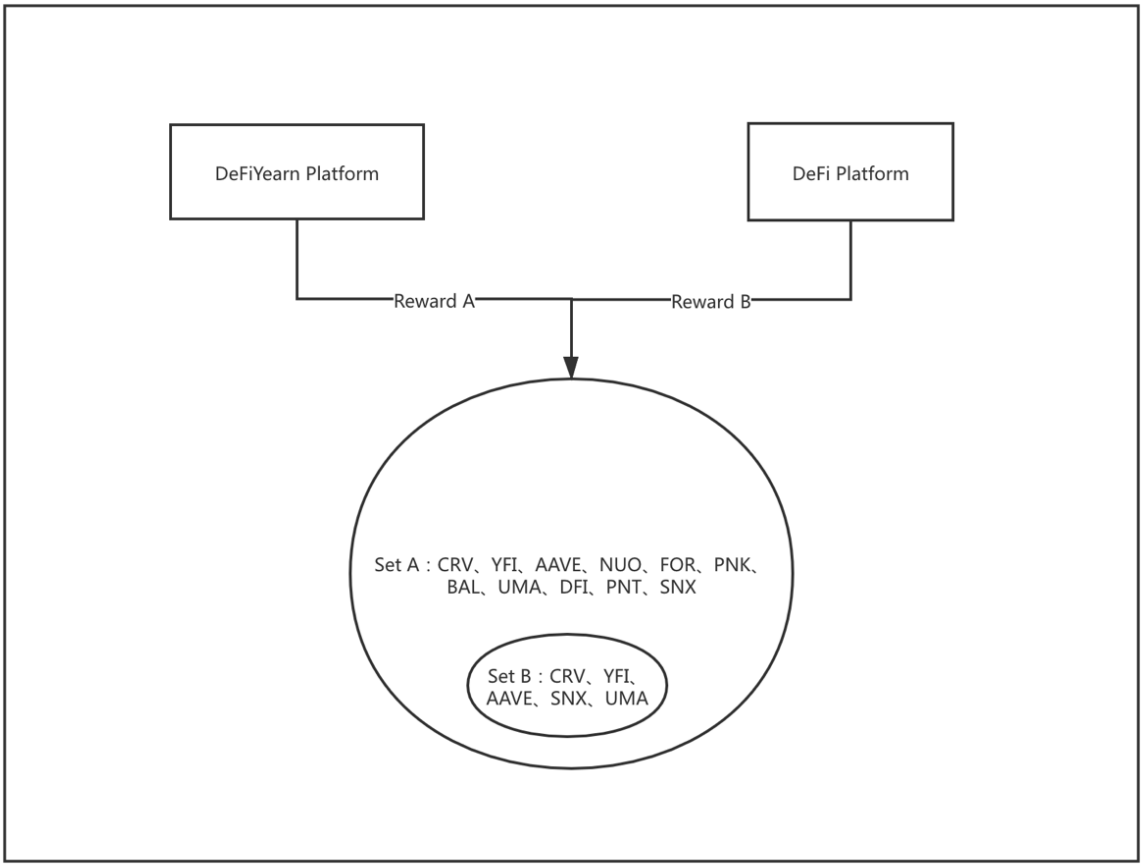
$$y = \frac{E\left(\mathrm{r}_p\right) - \mathrm{r}_f}{A\sigma_p^2}$$

Therefore, assuming that we know $E\left(\mathrm{r}_p\right)$ and σ_p^2, we can find the investor's best allocation ratio of risk-free assets and risk-free assets.

4.5 Comparison of DeFiYearn revenue and single DeFi platform revenue

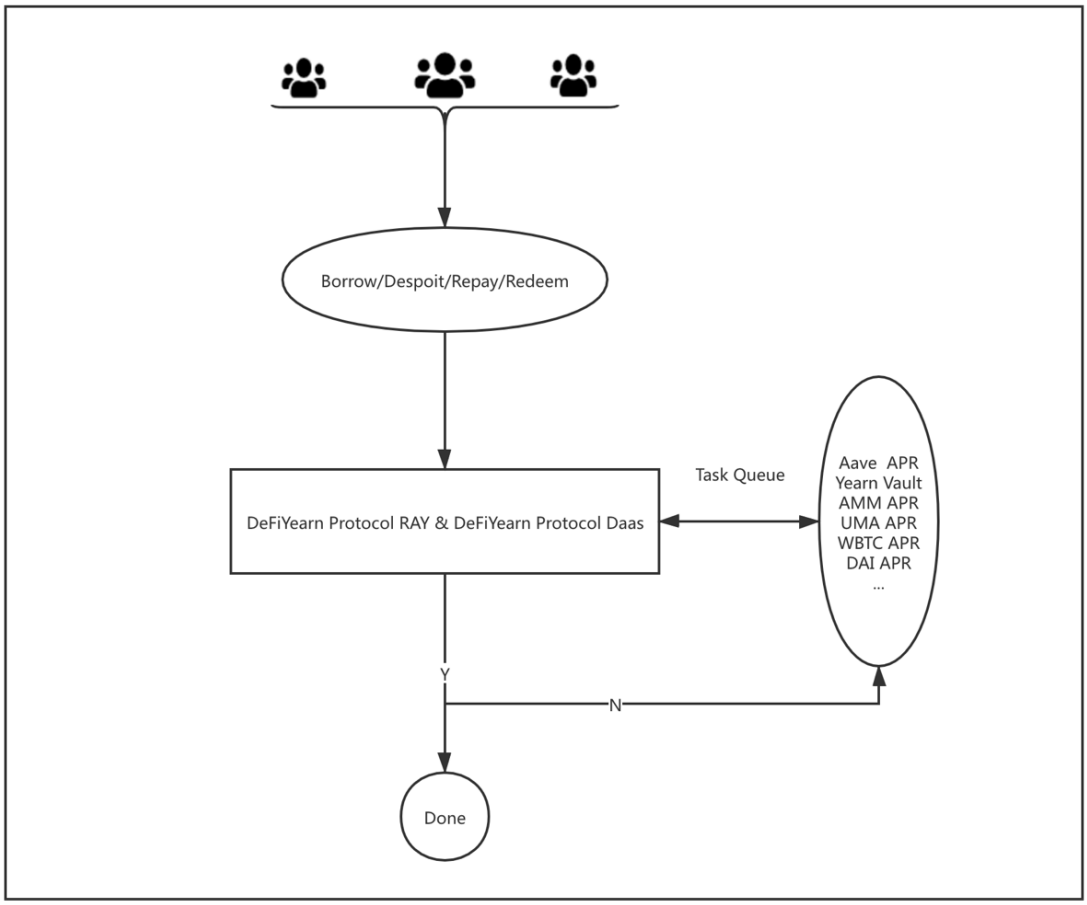
We use an example of a set to illustrate the revenue comparison between DeFiYearn and DeFi platforms. The so-called set is to classify several objects into one or several wholes of different sizes. Generally speaking, a collection is a whole of things with certain characteristics, or a collection of certain confirmed objects. The things or objects that make up a set are called elements or members. The elements of the set can be anything, people, things, letters or numbers, etc.

So we can calculate the overall value of each protocol and DeFi platform based on APR, and finally get the following figure:



4.6 A brief of the DeFiYearn operation process

On the DeFiYearn platform, investors do not need cumbersome procedures. After giving the platform permissions, investors can directly use the platform's visual interface to directly operate, such as deposits, exchanges, loans, and repayments. The basic procedures are as follows:



The operation of the DeFiYearn platform is very simple. Regardless of whether it is deposits, loans, exchanges, and repayments, it is basically a one-click operation mode, and the corresponding complex processes are handed over to the two aggregation protocols of DeFiYearn Protocol RAY and DeFiYearn Protocol Daas. RAY is responsible for finding the best Return On Investment, and Daas is responsible for the complicated processing of flash exchange, clearing, and one-click exchange, such as interaction with various agreements, how to use DFY and acceptance between agreements to consume the lowest fees, etc.

4.7 DeFi APR index by platform

After deriving from the above formula, according to Markowitz’ s portfolio theory, which is the rate of return of various investment products we know, finally calculate an effective margin and give the return of the best risk asset portfolio Rate, variance, and the proportion of each risk asset in the total risk investment portfolio.

nüo	11.37% APR	FLAT	nüo	13.29% APR	FLAT
AAVE	4.27% APR	FLAT	BlockFi	8.6% APR	FLAT
δY/δX	3.22% APR	FLAT	δY/δX	2.36% APR	FLAT
Compound	3.2% APR	FLAT	Compound	2.32% APR	FLAT
coinbase	2% APR	FLAT	AAVE	1.23% APR	FLAT
fulcrum	1.02% APR	FLAT	coinbase	0.15% APR	FLAT

5. Development Route

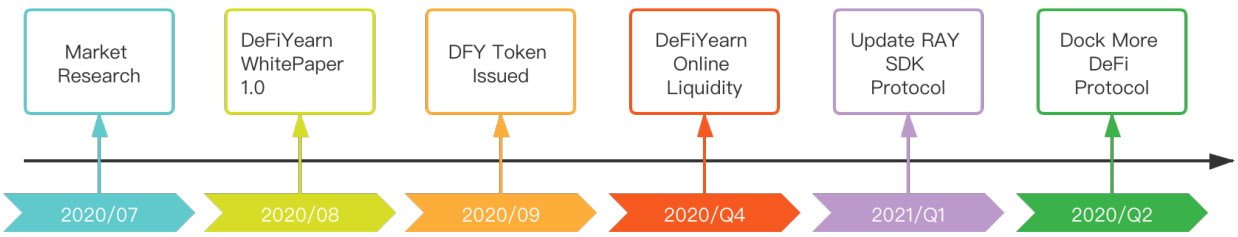
· Why provide MDP version?

a. Most Desirable Product (MDP), the most desired product. The first version of the product needs to provide users with the products they want most, not only in terms of functionality, but also on UI and product quality.

b. The MDP version is provided because the development and iteration of the DeFi protocol are very fast, so the initial team will develop a basic MDP for early investment institutions or individual users to use, and collect user feedback to improve the experience and add new features, while combining Make better adjustments to current market trends.

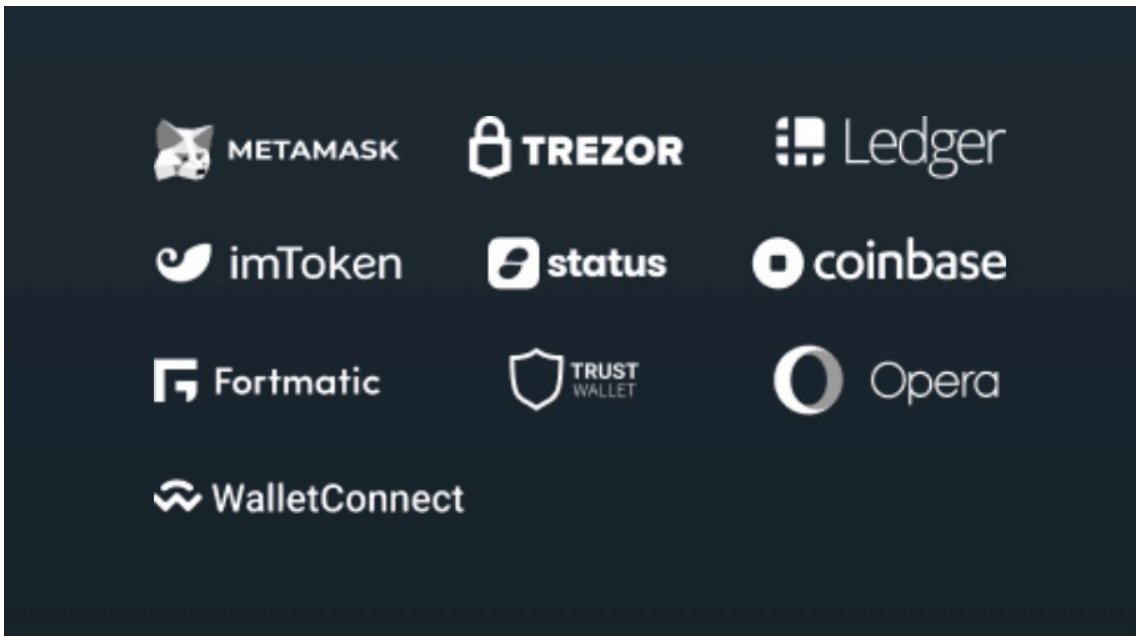
· DeFiYearn Releases Version

The main work of the team is focused on DeFiYearn SDK. Develop a more complete and scalable DeFi aggregation protocol architecture, add more and better liquidity mining protocols, AMM protocols, stable currency protocols, etc., to meet user needs, and allow users to save more complicated operations and obtain more Big gains.



6. Ecological Security

- MetaMask、Ledger、Coinbase、Imtoken、WalletConnect、Opera、Trust Wallet、Argent、Zerion、Trezor、Fortmatic、Squarelink、Portis、Torus、Authereum



- How to ensure the safety of DeFiYearn:

a. All DFY smart contracts are deployed in the ETH ecosystem, which is more secure than EOS, TRON and other public chains. However, we also invite some security agencies to review smart contracts to ensure that the code does not have 0Day and more securely protect each user's asset security.

b. To ensure that the DeFiYearn Protocol works as expected, the DeFiYearn team will conduct external audits with top companies in the field. External review is an absolutely necessary requirement, because the development team is too close to the written code to look at it in a fresh light, after all, the authorities are crazy. External audits reveal inconsistencies between specifications and implementation, ensure that documents are updated, emphasize the security model of smart contracts, and create a better experience for actors interacting with contractors.

- In addition to audits, the DeFiYearn team will also conduct agent simulations to model different scenarios and user behaviors to visualize changes in the system over time. We can model different user strategies that interact with our system and quickly forward the time to understand how system properties change.

- The DeFiYearn team will also formally verify the core contract functions. Formal verification is an expensive and complicated process, but it provides additional security. The core part of the system will be modeled internally by DeFiYearn's team and formally verified by an external auditor. It is important to ensure that we do this because distribution, internal accounting, mathematical attributes and specific variants ensure the safety of our users.
- Pre-audit agency:

a. Openzeppelin
b. Peckshield
c. Quantstamp

7. Conclusion

The vision of DeFiYearn Protocol is to create a decentralized financial network's aggregate bottom entry, becoming a bridge between users and the DeFi protocol, and using DeFiYearn to accelerate the arrival of the decentralized financial era.

RISK WARNING

- This white paper (hereinafter referred to as the "white paper") is for reference, explanation and discussion purposes only. It is not an offer to sell, nor is it an offer to buy any securities, other financial instruments or DFY. The information in this white paper may not be complete or final, based on forecasts and assumptions, may change, and not all major risks can be determined.

- The sale of DFY has not been registered or approved under any securities, commodities, futures, securities, financial instruments, capital market laws or regulations in any jurisdiction. In any jurisdiction where such sale is illegal, this white paper does not constitute an offer, solicitation or marketing to the retail public.

- Like all financial derivatives or financial service platforms, DeFiYearn Protocol cannot be risk-free. Here is a brief description of the reference risk of DeFiYearn Protocol. Of course, there may be other risks that have not been described or recognized.

- Decentralized finance has just started, and public chains such as ETH are not absolutely secure. Therefore, DeFiYearn Protocol may have potential code loopholes or risks of major external changes, as well as between other decentralized products, CRV, AAVE Vulnerabilities in the interactive platform code or major changes in the external environment will affect the price caller. This can be corrected in time through DAO governance and protocol forks.