What Is Decentralized Finance?: A Deep Dive by The Defiant

By

Camila Russo

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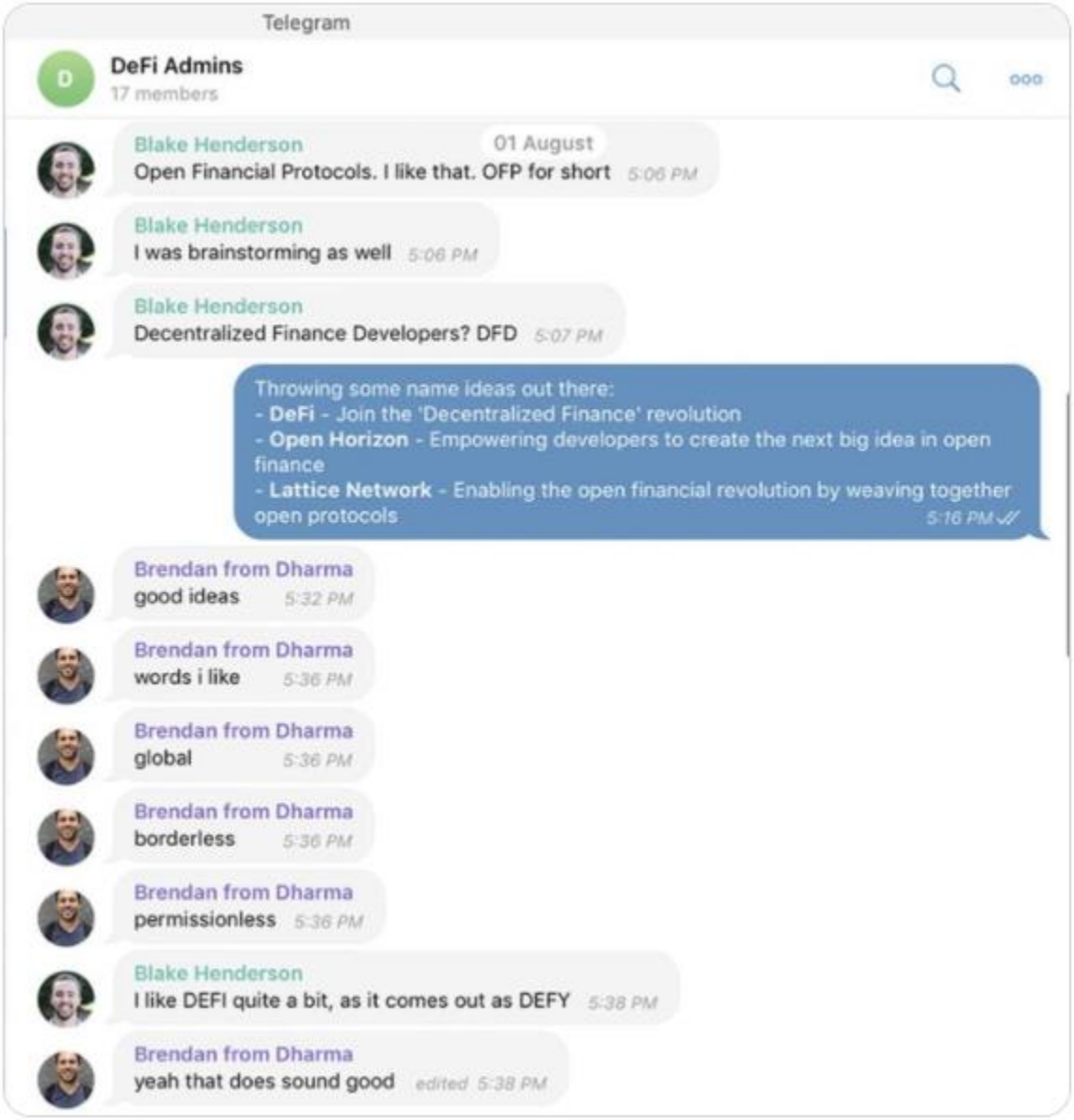
Definition

Decentralized finance, or DeFi, is the ecosystem of financial applications being built with blockchain technology.

The Term

The term DeFi, short for decentralized finance, was born in an August 2018 Telegram chat between Ethereum developers and entrepreneurs including Inje Yeo of Set Protocol, Blake Henderson of 0x and Brendan Forster of Dharma. They were discussing what to call the movement of open financial applications being built on Ethereum. Other options considered were Open Horizon, Lattice Network and Open Financial Protocols. Henderson said DeFi worked well, as it “comes out as DEFY.”



Characteristics

1. Non-Custodial

These distributed networks allow people to have control over their own assets and data and for value to be transferred from one person to another, without the need to use intermediaries like banks and other financial institutions. Users are the only ones who hold the keys to their wallets and control their

funds. The term used to describe this feature is that DeFi apps are “non-custodial,” as they don’t have custody of your assets — you do.

2. Open

These networks are also global, which means there are no borders in this parallel financial system, and everyone can access it. It's like the internet, but instead of information being transferred globally, seamlessly and creatively, the same is happening with money. It’s an internet of value.

3. Transparent

The code for these financial applications is open for anyone to see and inspect. This is important because anyone is able to verify how the applications and protocols work, and track exactly where their money is.

4. Composable

Open-source code also enables developers to build on top of others’ applications, accelerating innovation and allowing these applications to become like lego pieces, leveraging each others’ value — hence the term, “money legos.” And if users don’t like how one application is being built, they can copy the code and build a new app.

5. Decentralized

DeFi protocols are built on public blockchains like **Ethereum**. These blockchains, the rails to this new financial system, are run by thousands of

nodes —computers running the blockchain's software— spread out across the globe, so that it's almost impossible to censor or stop them.

On top of this base layer of decentralization, DeFi platforms are built to be managed by a community of users, and not centrally controlled. Users become owners of their financial applications; they're able to participate in major decisions, including by proposing changes themselves, and benefit from their growth and success. No centralized party can unilaterally take control of funds or change the rules of the game.

Open Finance

Most DeFi applications don't meet all of the characteristics listed above. Ironically, considering the name DeFi, the decentralized aspect is the hardest to meet. Completely relinquishing control of an application makes it harder for developers to quickly react if there's a problem, since they can't unilaterally make changes to it without going through community consensus. This is hard for applications which are still at very early stages of development, so teams will often maintain some degree of control over their protocols.

Decentralization is a spectrum, and while not all DeFi apps are at the most decentralized end, they are working to get there with teams gradually relinquishing control over their protocols.

Rather than decentralization, the main characteristic which most DeFi protocols meet and has come to define the ecosystem is that these applications are open for anyone to access. All users need is an internet

connection and a blockchain address. That's why the term "Open Finance" is often used instead of DeFi.

DeFi: A Brief History

One could argue that DeFi started with Bitcoin in 2009. BTC was the first-ever peer-to-peer digital money; the first financial applications built on blockchain technology.

But the turning point for financial applications allowing users to do more with their money than send it from point A to point B happened in December 2017, when MarkerDAO launched.

MakerDAO is an Ethereum-based protocol that allows users to issue a cryptocurrency that's pegged at 1-to-1 to the value of the U.S. dollar by using digital assets as collateral. This mechanism effectively allowed anyone to borrow the Dai stablecoin against Ether (Ethereum's native cryptocurrency). It created a way for anyone to take out a loan without relying on a centralized entity. It also created a dollar-pegged digital asset, which didn't rely on holding dollars in a bank, like USDC, USDT and other stablecoins.

The MakerDAO lending protocol and its Dai stablecoin provided the first building blocks for a new, open, permissionless financial system. From there, other financial protocols launched, creating an increasingly vibrant and interconnected ecosystem. Compound Finance, released in September 2018, created a market for borrowers taking out collateralized loans, and lenders to rake in interest rates paid by those borrowers. **Uniswap**, launched in

November 2018, allowed users to seamlessly and permissionlessly swap any token on Ethereum.

Less than three years after MakerDAO placed the first money lego, there are now dozens of DeFi applications, from basic use-cases like enabling lending, borrowing, trading, to crazier ones like creating synthetic assets, streaming payments and playing in a lottery where you can always get your money back.

Assets held in these platforms' smart contracts climbed to surpass $1 billion, then quickly $2, $3 and $4 billion just this year. It's clear we're just getting started.

Not a Buzzword: DeFi Is an Ecosystem of Financial Applications

As the term decentralized finance starts popping up with increasing frequency in headlines and conversations, its short-hand, DeFi ,may start to sound like an empty term. But it's far from just a buzzword.

DeFi is a growing ecosystem of actual, working protocols and applications, which are delivering value to several thousands of users, and transacting the equivalent of hundreds of millions of dollars in digital assets, every day.

The very foundations of a new financial system are being laid, with applications that enable everything from simply making transfers and

payments, to lending, borrowing, trading, portfolio management and insurance.

Here's an overview of some of the most popular applications in decentralized finance.

MakerDAO

MakerDAO is the protocol that issues the stablecoin **Dai**. Co-founded by Rune Christensen in 2015, it was one of the very first projects to be built on the Ethereum network, and can be considered the foundation for DeFi.

Dai is pegged at 1-to-1 to the value of the U.S. dollar. Unlike other stablecoins, which are backed by dollars in a bank, Dai is backed by digital assets held in MakerDAO's smart contracts. This makes Dai one of the few stablecoins that reduces the risk of censorship from regulators and financial institutions, providing a more decentralized alternative.

Dai is issued against digital assets that anyone can deposit into Maker's smart contracts, which are called "Vaults." These assets, or collateral, need to be around 150% the value of Dai borrowed. Borrowers pay a stability fee, which works similarly to a borrowing interest rate, when the loan is closed. If their collateral drops below the 150% ratio, the loan is liquidated, which means assets locked up are sold at a discount, and borrowers pay a penalty fee.

Once Dai is issued, borrowers are free to sell it in exchange for goods, services or more crypto: that's how a secondary market for Dai is created.

Anyone can also buy Dai in an exchange; it's not necessary to take out a collateralized loan.

Dai can also be deposited in Maker and in other lending protocols to earn a variable savings rate, allowing anyone in the world to open a dollar-based savings account.

The other piece of MakerDAO is the **MKR token**. Unlike Dai, MKR is volatile and not pegged to anything. Holders of MKR can vote in Maker's governance system, where everything from borrowing and lending rates to the types of collateral accepted is decided. MKR holders benefit when the token increases, but they also take the biggest hit when the system fails; when collateral falls too sharply, MKR is minted and sold to make up for it.

Compound Finance

Compound Finance is a lending protocol built on Ethereum. Anyone can lend out their assets to gain interest or borrow assets against collateral. Compound was co-founded by Robert Leshner and launched on the mainnet in September 2018.

The platform is open for anyone, anywhere in the word to use and financial contracts are executed automatically by computer code. Securing loans doesn't depend on credit score or the person's income and liabilities, but on the assets they deposit in the system to cover for the value of the loan; in short, loans in Compound as in most of DeFi, are over-collateralized. It's not

the most capital efficient system, but it allows loans to be permissionless and automatic.

If the collateral drops below the required ratio, the funds get sold in the open market at a discount (ie. liquidated).

Interest rates paid out by borrowers of tokens including BAT, DAI, SAI, ETH, REP, USDC, WBTC and ZRX, is earned by lenders of those assets. Lenders earn interest continuously and funds can be removed at any time — so no waiting until the end of a fixed period in a time deposit.

The biggest difference between Compound Finance and a savings account in a bank is that lenders get tokens representing their deposits and the interest earned —like a derivative of their assets. These instruments are called cTokens — cDai is for Dai deposits, etc. These tokens can in turn be used as collateral to borrow against or sold for other cryptocurrencies. Savers can get cTokens by depositing assets in Compound or by simply buying them in the secondary open market, on a **DEX**.

Compound launched its own native COMP governance token in May 2020. COMP was distributed to users of the platform in proportion to the funds they have lent or borrowed. Token holders are able to participate in Compound's governance system, proposing and voting on changes. It's the way for the Compound team to cede control to its community as management of the project starts to become closer to an open protocol than a company.

Uniswap

Uniswap is one of the largest decentralized exchanges by trading volume on Ethereum. It was founded by Hayden Adams in November 2018. Uniswap is one of the first DEXs to pioneer the automated market maker system, which allows traders to swap tokens without relying on an order book. This is important in crypto where, after BTC and ETH, there is a long tail of less liquid tokens which are hard to trade if you need to wait to be matched by a counterpart.

The automated market maker (AMM) model relies on liquidity pools, in which each token is paired with ETH, ensuring there's always enough liquidity between any two tokens.

The price is set by a simple equation: x * y = k, proposed by Vitalik Buterin in a 2018 research paper. In the so- called "constant product market maker" formula, x and y represent the quantity of ETH and ERC20 tokens in a liquidity pool and k is the product of the two. K must be kept constant and for that to happen, x and y must move inverse to each other.

Thanks to liquidity pools and the price being defined by a formula, a trade can always take place — though spreads may still be wide on illiquid pairs.

Unlike centralized exchanges, which have been reported to charge exorbitant amounts to list tokens, anyone can list any token on Uniswap. All they have to do is create a liquidity pool by supplying the ERC20 token and ETH.

Also unlike centralized exchanges, which verify users' identities and have the power to restrict traders from some locations, Uniswap is an open protocol

open for anyone to use. All traders need to start swapping tokens is an Ethereum address.

Anyone is also free to provide liquidity to these pools of tokens in exchange for trading fees in proportion to their share of the pool's liquidity. Liquidity providers can add to or withdraw their funds at any time. Uniswap doesn't have a native token, but liquidity providers get tokens which represent their share of the pool.

Balancer

Balancer is both an asset manager and a decentralized exchange built on the Ethereum network. It was founded by Fernando Martinelli and Mike Ray McDonald in March 2020. Similar to Uniswap, Balancer enables anyone to create pools of tokens, which rebalance to keep the same ratio among those tokens, regardless of their price change. The difference is that more than one token can be added, and ETH isn't required. Effectively, it allows anyone to create something like an ETF —an index fund made up of crypto assets.

There are private pools, where only the creator of the pool can add liquidity and has full control over the pool's parameters. There are also shared pools and smart pools, open for anyone to invest in and gain exposure to how the portfolio moves. Investors can supply any of the tokens in the portfolio and they get BPT, or Balancer Pool Token in exchange, which represents their ownership of the pool. The difference between shared and smart pools is that in shared pools, the parameters are set, while in smart pools, they can be changed.

The other side of the protocol is the DEX. Traders can swap tokens in the liquidity pools and take advantage of arbitrage opportunities when they become imbalanced. The trading fees they pay to exchange tokens go to the token pools' liquidity providers.

This is what allows Balancer to be an inverse ETF; instead of paying portfolio management fees to hold an index fund, investors collect fees from traders.

In June 2020, Balancer distributed its governance token BAL among liquidity providers. BAL tokens allow holders to participate in the protocol's governance system.

Synthetix

Synthetix is a protocol for minting and trading synthetic assets on Ethereum. It was founded by Kain Warwick in 2017 as stablecoin project Havven, and launched as Synthetix on the mainnet in February 2019.

On-chain synthetic assets, or Synths, are minted on the platform. Synths are designed to track the value of crypto to and non-crypto assets, including forex, commodities and indexes. There are now almost 40 different trading pairs on Synthetix, including for gold, silver, the Japanese yen and UK's FTSE stock index.

Like all of DeFi, Synthetix is open and permissionless, which means anyone in the world can have access to trading securities, which has been restricted to the very few in the past.

Users can deposit Synthetix's native token SNX in a smart contract to issue new Synths.
This pooled collateral enables traders to swap Synths directly with the smart contract, avoiding the need for counterparties. SNX holders who stake their tokens are paid a pro-rata portion of the fees generated through activity on Synthetix's exchange. Still, trading on Synthetix.Exchange does not require the trader to hold SNX.

In July 2020, the project started to wind down the Synthetix Foundation, which had largely guided the direction of the platform, so that three decentralized autonomous organizations, or DAOs, would take control of the protocol. DAOs are on-chain organizations led by the wider community and token holders. Synthetix's move is part of a wider trend in DeFi to become increasingly more decentralized and community-owned.

Curve Finance

Curve Finance is a decentralized exchange focusing on stablecoins. It was co-founded by Michael Egorov and launched in January 2020. Curve uses liquidity pools like Uniswap, but because pools are between stablecoins, which have roughly the same value, it is able to minimize slippage for traders and reduce or eliminate impermanent loss for liquidity providers. Impermanent

loss is a common problem on other DEXs as volatility of token pairs against ETH reduces returns for liquidity providers.

The other difference with other AMMs like Uniswap and Balancer is that tokens in Curve's liquidity pools are lent out on DeFi money markets like Compound and yEarn Finance. This allows liquidity providers to earn trading fees and also returns from those lending pools.

Curve launched its own native token CRV in August 2020, and uses it to reward users for providing liquidity and as a way for the community to take control over the protocol's governance.

Yearn.finance

Yearn Finance is a lending aggregator, known as a yield bouncer, which optimizes users' deposits by routing them to lending and liquidity pools offering the most yield. It uses protocols including Compound, Dydx and Curve Finance. It was founded by Andre Cronje in February 2020.

Users who deposit tokens into Yearn, get yTokens representing those deposits, in return —Dai depositors get yDai, USDC depositors get yUSDC and so forth.

Curve Finance created a liquidity pool of yTokens, using yDAI, yUSDC, yUSDT, yTUSD, which allows savers to earn trading fees on Curve on top of lending fees for their deposits.

Yearn issued its native governance token YFI in July 2020. YFI was distributed only to users who stake yTokens to pre-specified liquidity pools. In a first for an Ethereum token, there was no pre-sale to investors, there was no allocation for the Yearn team, and it wasn't sold through an exchange — only Yearn users could earn YFI in its primary listing.

Control of YFI was transferred from Andre Cronje to a multi-signature wallet, which requires six out of nine participants to agree on changes. YFi token holders have full control over Yearn Finance's governance system, and can propose and vote on changes to the protocol via on-chain votes.

Yam Finance

Yam Finance is a project designed to reward users with YAM tokens in exchange for their deposits of cryptocurrency into different liquidity pools. It was founded in August of 2020 by a group of cryptocurrency developers, investors and entrepreneurs including Dan Elitzer of IDEO and Will Price of Flipside Crypto.

It was one of the first projects built specifically around the trend of yield farming — depositing cryptocurrency tokens in DeFi platforms to earn the platform's native tokens on top of lending interest rates. The launch was controversial as it was built seemingly overnight by copying the code of different DeFi protocols, and released on mainnet without a formal audit. Following the footsteps of YFI, only Yam Finance users were able to earn YAM in its primary listing.

YAM is pegged to 1 USD and controls its peg by contracting or expanding its supply.

The platform drew hundreds of millions of dollars in a day and its success spurred a flurry of copycats, and also an explosion of so-called meme coins, or tokens linked to an emoji and funny name, many of which were also linked to food (CREAM, SHRIMP, TACO, PASTA).

Two days after its launch, the team found a bug in its code which would make governance impossible and raised funds from the community to audit the code of a new version of YAM. Token holders were still in the process of mIgrating to YAM v2 and awaiting the final version of YAM v3 at the time of writing.

The 2020 Year In Review: DeFi - Decrypt

The 2020 Year In Review: DeFi

In 2020, decentralized finance took off, going from $700 million locked into DeFi smart contracts at the start of the year, to $15 billion.

By Robert Stevens

8 min read

Dec 26, 2020

DEFI IS A SYSTEM OF OPEN, PERMISSIONLESS, AND INTERLOCKING FINANCIAL PRODUCTS BUILT ON ETHEREUM (IMAGE: SHUTTERSTOCK)

In brief

- Decentralized finance boomed in 2020.

- The amount locked in DeFi protocols has gone from $700 million at the start of 2020, to $15 billion in December.
- Yield farming took DeFi to new heights in 2020, though Bitcoin's recent bull run has diverted attention away from the DeFi space.

If there's one word that sums up crypto innovations in 2020, it's DeFi. DeFi is a portmanteau of two words—decentralized finance—which itself is an umbrella term for hundreds upon hundreds of crypto projects started this year in the vein of non-custodial financial projects.

Bitcoin Basics

DeFi: The Ultimate Beginner's Guide to Decentralized Finance

Decentralized finance, or DeFi, sits at the white-hot center of 2020's crypto bull run. DeFi is crypto's big thing at the moment, a little like how Initial Coin Offerings (ICOs) were all the ...

LearnThe Landscape

Robert Stevens

Oct 1, 2020

12 min read

But there's a lot to unpack from 2020. What was once an industry full of fledgling protocols struggling to get investors to invest a total of $1 billion into them is today worth multitudes of that. As of December 2020, there is $15 billion locked into DeFi protocols; the industry, however, is today worth far more if you consider the market cap of DeFi coins as well as the traditional financial institutions now considering integrating DeFi services.

As the year comes to an end, *Decrypt*'s here to weave the DeFi story into one neat package, fit for consumption along with buckets of mince pies and bottomless glasses of sherry.

January - March: DeFi products arise

On January 1, decentralized finance wasn't really a thing. Sure, there was about $700 million locked into various DeFi smart contracts, per DeFi Pulse, but the industry was still fledging and nascent and burgeoning and *in utero*. It was, however, a marked increase from the previous year; on January 1, 2019, there was $278 million locked into DeFi smart contracts.

ETH

+402.80%**$643.18**

24H7D1M1YMax

Dec 27Feb 2Mar 10Apr 16May 23Jun 29Aug 5Sep 11Oct 18Nov 24100200300400500600700

ETH Price

Buy Ethereum

Investing in DeFi was like sticking your neck out. *Decrypt* ran a profile on Framework Ventures, a venture capital firm devoted to investing in DeFi. Michael Anderson, a co-founder, predicted that there would be more than $3 billion in DeFi assets by the end of the year, much to the surprise of *Decrypt*. All of the tokens they

told *Decrypt* they had invested in blew up later in the year. “2020 is really the year that it scales,” said Anderson.

And it was!

DeFi’s 2020 vision got off to a rocky start. In February, a series of exploits took millions of dollars from bZx’s Fulcrum protocol in a flash loan oracle manipulation exploit, the first major incidence in dozens of similar attacks. This involved taking money from a DeFi lending protocol, then using that to manipulate the prices of money held in other DeFi protocols, and buying those tokens for a small amount of money.

Things looked like they were going well once more by March, just as Bitcoin’s price increased to around $10,000. DeFi lending protocol Aave, a smart contract protocol that then held $35 million (as of this writing, it holds $1.37 billion), integrated Tether.

March - May: coronavirus blues

Then, out of nowhere, the pandemic struck. Bitcoin fell to lows of around $4,500 in the middle of March. The ruckus caused problems for DAI, MakerDAO’s decentralized stablecoin. The crash caused a massive exodus of ETH that was backing DAI, leading the price of the stablecoin, supposed to be worth $1, to increase to beyond $1.1. To stop the bleeding and to save DAI, MakerDAO proposed that USDC, a centralized stablecoin, be used to collateralize DAI.

But as governments patched the economic collapse caused by the pandemic, Bitcoin recovered, and DeFi was back on track. The remainder of the first half of 2020 was overshadowed by the Bitcoin halving, which cut the block reward of Bitcoin miners

in half. Andre Cronje, creator of yearn.finance, threatened to quit, then, uh, didn't.

June - October: DeFi steals the show

Things started to get crazy for DeFi in June. It was toward the end of that month that Compound issued $COMP, a so-called "governance token", to everyone who used it. COMP is designed for use in Compound's governance protocols; a way of putting your money where your mouth is and have an active say in the future direction of the protocol. But in practice it became a form of speculation on the future worth of Compound, and people started using Compound for the express purpose of farming the token. The game, known as yield farming, was afoot.

Other protocols, like Aave and yearn.finance, launched their own governance tokens. Yearn.finance's YFI soared to highs of around $40,000—though its token supply is capped at just 30,000. Yield farming kicked the industry into action. The amount locked into DeFi protocols would increase by about $1 billion every week, and sometimes far sooner.

DeFi spawned a whole subculture. So-called "DeFi Degens" would scour the web, looking for new yield farms to play. And new projects sprung up, a dozen every day, offering high yields. Some farms offered yields of over 1000%. Many, obviously, were scams, and a lot of investors got burned. And others, rushed to market in an effort to jump on the hype train, were full of vulnerabilities.

The boom of activity surged volumes on decentralized exchanges. The biggest, Uniswap, handled volumes that at some points beat Coinbase Pro, one of the largest centralized exchanges.

The subculture also found its sense of humor. All of a sudden, so-called “meme” coins sprouted from thin air, all based around a specific theme—food. There’s Tendies, YAM, Pickle Finance, MEME (whose icon is a pineapple), SushiSwap, BurgerSwap, Kimchi, Cream Finance, and dozens of others.

Ethereum

Billions in Ethereum at Play: DeFi Meme Coins are No Joke

Investors plugged $8 billion dollars into decentralized finance (DeFi) in the past three months alone, motivating the more creative members of its community to find new ways to create billions...

NewsDeFi

Mathew Di Salvo

Sep 4, 2020

6 min read

SushiSwap, a spinoff of Uniswap that incorporated yield farming mechanics, grabbed the DeFi community's attention when its creator, the so-called "Chef Nomi", cashed out in September, taking $14 million of Ethereum earmarked for development funds. The community was so incensed that they guilt-tripped Nomi into returning. Eyes to the floor, he returned the money and handed control of SushiSwap over to Sam Bankman-Fried, the CEO of FTX. Bankman-Fried later handed the reins back to the community.

The industry grew and grew, but everyone knew that it couldn’t sustain itself. To convince investors to keep their money in DeFi protocols, developers kept minting more and more tokens. But at

some point, the market would become so inflated that yield farmers wouldn't make as much anymore, and any protocol fuelled entirely by speculation collapsed.

But until that happened, the DeFi industry looked set to keep growing and growing. The only thing nagging at its side were those pesky Ethereum fees; DeFi had outgrown Ethereum, which wasn't fast enough to handle all of the traffic. Ethereum's transaction fees rose to exorbitant levels, in some cases hitting highs of about $15 for a single transaction.

October - December: Bitcoin bites back

Much of the fun came to an end in October. DeFi yields started to dry up and all the low-hanging innovations available to DeFi developers had been picked. The amount locked in DeFi protocols was still increasing, but at a slower pace. Volumes at Decentralized exchange such as Uniswap were telling. DEX volumes, which had been $8 billion per week at the end of August, fell to $6 billion in September, and then fell by more than 40% in October to just under $3 billion.

DeFi had lost its shine, but in its place was a new wave of finance that took the crypto world by storm once again: Bitcoin. Bitcoin had remained stagnant all through the summer; starting in October, Bitcoin was worth around $10,500. Then it started to rise. And rise. And rise. By the end of November, Bitcoin had broken its all-time high, set in 2017.

BTC

Much of the attention showered on DeFi stopped, but the industry still benefited from all the extra money flowing into crypto. DeFi, after all, had become a valuable way of earning extra money on crypto that would otherwise sit idle in wallets. So while new products weren't coming to market as thick and fast as they did over the summer, DeFi still grew. At the start of October, there was about $11 billion locked in DeFi protocols, per DeFi Pulse. At the start of December? Close to $15 billion.

DeFi in 2021 and beyond

Decrypt doesn't yet own a crystal ball. But there are a few directions DeFi looks set to take next year. The first is obvious: As big players, including large financial institutions, continue to invest in crypto, many may seek to integrate crypto into their offerings.

Diem, formerly Libra, will introduce its stablecoin next year; PayPal will continue to roll out its crypto offerings worldwide; and large US financial institutions may hold custody over their customers' cryptocurrencies as applications to become crypto banks make their way to the top of bureaucrats' pile.

And closer to home, crypto exchanges will continue to dip their toes in DeFi as the projects become more stable. Several exchanges, such as Binance and Huobi, have invested big into

DeFi. Huobi, for instance, has its own DeFi research lab, which may bring new products to market next year.