Week 5

Stellar in the DeFi Ecosystem

Stellar Technical Academy

UNIC | DLRC Stellar

Session 5: Agenda

1. Introduction to Decentralized Finance (DeFi)
2. Stellar and the AMMs
3. Conclusion

Session 5: Objectives

In Week 5 of the Stellar Technical Academy, you will:

- ✓ Get acquainted with term of Decentralized Finance (DeFi) and how it connects with blockchain
- ✓ Understand the role of stablecoins in DeFi
- ✓ Understand the differences between Decentralized Finance (DeFi) and Traditional Finance (TradFi)
- ✓ Discover the ways Stellar and Automated Market Makers (AMMs) interact and contribute

1. Introduction to Decentralised Finance (DeFi)

Decentralised Finance (DeFi) on Stellar

What is Decentralised Finance (DeFi)?

- DeFi or Decentralised Finance, is an umbrella term for a variety of applications and projects that take place in the public blockchain space and are geared towards challenging and disrupting the traditional finance world, as we know it.
- More specifically, DeFi, being inspired by blockchain technology, is related to financial applications built on blockchain technologies, which typically use smart contracts. This means applications such as lending, staking, yield farming and liquidity mining.
- Simply put, smart contracts are the essence of blockchain technology and are automated enforceable agreements that do not need intermediaries to execute.
- In general, DeFi consists of applications and peer-to-peer (P2P) protocols that are developed on decentralised blockchain networks.
- These networks require no access rights for easy lending, borrowing or trading of financial tools.
- In recent years, DeFi has grown into a financial ecosystem to be reckoned with, with working protocols and applications that deliver value to millions of users.
- As of early 2022, assets worth more than $30 billion are locked in DeFi ecosystems, making it one of the fastest-growing areas of the public blockchain space.

Introduction to Decentralised Finance (DeFi)

What is Decentralized Finance (DeFi)?

- Decentralised finance (DeFi) is a fast-growing part of the crypto-financial system, and it is a product of blockchain technologies, since the respective crypto assets serve as mediums of exchange.
- The term DeFi refers to financial applications run by smart contracts on a blockchain, typically a permissionless (i.e. public) chain.
- DeFi aims to provide financial services without using centralised entities and easy access with 24/7 availability.
- More specifically, it digitizes and automates the contracting processes, which could improve efficiency by reducing intermediation layers.
- Moreover, it also provides users with much greater anonymity than transactions in traditional finance. The transactions are inherently tamper-proof, due to the nature of the underlying blockchain transactions.

Introduction to Decentralised Finance (DeFi)

DeFi's Building Blocks

- Stablecoins are the backbone of DeFi: they are cryptoassets that strive to tie their values to fiat currencies, such as the US Dollar. They play an important role in the DeFi ecosystem, facilitating fund transfers across platforms and between users.
- Stablecoins allow DeFi market participants to avoid converting to and from fiat money at every turn. They also act as a bridge between the crypto and the traditional financial systems, which share a common numeraire – i.e., fiat currencies.
- They record all transacting histories directly on-chain, without the involvement of centralized intermediaries. They rely on an overcollateralized pool of cryptoassets, i.e., the underlying assets are worth more than the stablecoins in circulation.
- Since crypto collateral has a very high price volatility, DeFi stablecoins incentivize users to actively monitor the collateralization ratio.
- To do so, the smart contracts behind these stablecoins allow any user to seize the collateral when the collateralization ratio falls below a certain threshold (which is higher than 100%) and to redeem the stablecoins. Such a design ensures that the value of stablecoins remains tied to the fiat currency.

Decentralised Finance (DeFi) on Stellar

Stellar's Network Efficiency and DeFi

- It is well established that Stellar, as a base network, excels in network efficiency, capital efficiency, asset flexibility and decentralised consensus.
- Network efficiency holds great importance in the DeFi space. More specifically, one of DeFi's key improvements over the traditional financial ecosystem is the increased efficiency gained by removing intermediaries and making accessibility easier due to the decentralized nature of DeFi protocols.
- However, the network efficiency improvement can not have much to offer if the DeFi protocol is built on a network that is expensive.
- For example, a traditional financial derivative costs over $0.24 to process, due to the intermediaries involved in the execution and trading, while when facilitating derivatives using a DeFi protocol, this cost is removed.
- Nonetheless, this improvement is useless if the DeFi protocol incurs more than $0.24 in network fees to process a derivative.

Decentralised Finance (DeFi) on Stellar

Stellar's Network Efficiency and DeFi

- What is more, Stellar's network efficiency is crucial for realizing the increased financial ecosystem accessibility offered by DeFi.
- DeFi protocols are unable to make finance more accessible when the high fees make it nonsensical for potential users to participate.
- That's why Stellar's near-to-zero fees encourage potential users to participate in the protocol and make sure to avoid this economic exclusion.

Decentralised Finance (DeFi) on Stellar

Stellar's Capital Efficiency and DeFi

- **What is capital efficiency?**
  - Capital efficiency is the return on capital spent or at risk. This means that maximizing efficiency maximizes returns too.
  - Moreover, it is quantifiable as a risk-to-reward ratio. For example, if you were to invest one XLM and received one XLM, the capital efficiency is 1:1, while if you were to invest one XLM and received five XLM, the ratio is 1:5.
- Capital efficiency is crucial for improving yields and lowering slippage for the DeFi protocol users.
- Stellar offers capital efficiency by having one focal place for decentralised trading.
- This way, it concentrates liquidity resulting to lowering slippage for traders and improving yields for market makers and liquidity providers.
- In comparison to other networks, Stellar outperforms a variety of them in terms of capital efficiency, since it doesn't use a PoS (Proof of Stake) consensus model.
- Although PoS has become the go-to consensus model for blockchains that want to move away from the inefficient PoW (Proof of Work) consensus it comes with a great disadvantage: its network validators need to lock up capital simply to prove their trustworthiness.
- Since the SCP (Stellar Consensus Protocol) can verify the trustworthiness of validators without having to rely on staking, it is more capital efficient than PoS.

Decentralised Finance (DeFi) on Stellar

Stellar's Asset Flexibility and DeFi

- DeFi's real value will be appreciated once transacting of traditional assets on its protocols is achieved.
- As we have mentioned in the previous chapters, Anchors facilitate moving value from the traditional banking system into Stellar and vice-versa.
- Basically, they allow issuing of fiat tokens and/or provide fiat on/off-ramps.
- Therefore, Stellar's anchor system enables the issuance of any asset on the network and makes it easy to verify that a trustworthy organisation issued it.
- Since Stellar's Anchors are highly configurable, Stellar has asset controls that allow Anchors to control what accounts can hold their issued assets, how their issued assets can be used and even delete issued assets from accounts (with the introduction of clawbacks).
- These controls are crucial to allow anchors to perform KYC (Know Your Customer) and comply with regulations.

Decentralised Finance (DeFi) on Stellar

Stellar's Asset Flexibility and DeFi

- A prominent example of this is the DSTOQ use case.
- DSTOQ adopted Stellar in enabling access to Tokenized Assets.
- More specifically, the organisation detected the following problem: while those who live in high-income economies can easily access high-quality securities and other investment opportunities, the population of emerging markets doesn't have the ability to hold best-in-class assets for growing, diversifying, or protecting wealth. This results in these populations holding onto money whose value diminishes over time, especially in high-inflation countries.
- However, DSTOQ decided to tackle this by increasing worldwide access to high-quality securities via tokens on Stellar and transacting these tokens on a borderless digital interface.

Decentralised Finance (DeFi) on Stellar

Decentralised Consensus on Stellar and DeFi

- One more thing that makes the Stellar Network suitable for DeFi protocols is the crucial need for DeFi protocols to ensure decentralised consensus.
- It is a known fact, that true decentralisation is one area where many blockchain networks struggle. For instance, you can remember the differences between the Bitcoin and Ethereum consensus.
- Some networks are reliant on a central group of nodes run by the same organisation. If all the nodes run by that central organisation were to go down at once, the blockchain would stop running (downtime).
- Uptime is also critical for DeFi protocols as any network downtime can be disastrous for protocol users.
- Coming to the rescue, Stellar proved, through a ‘trial by fire’, that the network is truly decentralized.
- In detail, on 6 April 2021, all of the Stellar Development Foundation’s Tier 1 validators went down, along with the validators of LOBSTR - a custodial wallet with 2FA key recovery that allows storage of any Stellar-based asset and execution of trades on the Stellar decentralised exchange.
- Nevertheless, the network, as it is truly decentralised, remained online and continued processing transactions!

Decentralised Finance (DeFi) on Stellar

Decentralised Consensus on Stellar and DeFi

- Decentralisation is also a feature of vital importance in order to achieve the financial inclusion that DeFi protocols offer.
- One central organisation shouldn't be responsible for deciding who can access the blockchain. The decentralisation of Stellar nodes and the ease of adding new ones ensure that this will never be the case.
- Moreover, as we have mentioned before, one of Stellar's prominent qualities is that it is impossible to hard-fork, due to the design of the SCP.
- Hard-forks invite a whole host of legal issues. As an example, let's say that there is an anchor issuing an equity token on a blockchain that experiences a hard-fork. There will now be two copies of that equity token. How do you decide which one is legally the 'real' equity token? The easy answer is that the issuer will decide, but what if the equity token owners disagree with the issuer's decision?
- Since the SCP is designed to avoid hard-forks, it is a natural choice for traditional financial asset issuers.

Introduction to Decentralised Finance (DeFi)

Decentralised Finance (DeFi) VS Centralised Finance (CeFi)

- The key difference between Decentralised Finance (DeFi) and TradFi (Traditional Finance) lies in whether the financial service is automated via smart contracts on a blockchain or is provided by centralised intermediaries.
- While DeFi records all the contractual and transaction details on the blockchain (i.e., on-chain), TradFi relies on the private records of intermediaries, such as centralised exchanges and other platforms (i.e., off-chain).
- In addition, the centralised exchanges identify which digital currencies they offer for trading or how many fees the users have to pay for trading with the exchange.
- To complete the concept of Centralised Finance, you do not own their digital currencies when you buy/sell through a centralised exchange. Moreover, you are subject to the rules that a centralised exchange imposes on them.
- Finally, DeFi users are confident that the technology will work as intended to provide the services offered. On the other hand, TradFi users trust a company's employees to manage funds and provide the company's services.

2. Stellar and the AMMs

Introduction to Decentralised Finance (DeFi)

Automated market makers

- An Automated Market Maker (AMM) is a protocol that runs the DEX. The interaction happens with a smart contract in a liquidity pool. The main purpose is to provide liquidity and exchange assets. The DeFi apps are used in a trustless environment with a non-custodial wallet.
- The easy access of AMM and the scalability made them very popular in the ‘DeFi Summer’ of 2020. The users were attracted by accessing large amounts of capital and the possibility of trading high volumes.
- The AMM can be divided into three layers. The first layer is the DEX. The second layer is where the AMM is active and represents the order book. The third layer is comprised of the different types of AMMs and how they determine their price, such as the Constant Product Market Maker model. It requires that the total amount of liquidity ‘k’ in the pool remains constant (x * y = k). The total value of the asset ‘x’ is multiplied by the value of ‘y’.
- Due to the time where the value of the asset is locked in the liquidity pool there can occur a risk named impermanent loss. This happens when you provide liquidity to a pool and the price of your deposited asset has changed compared to when you deposited. You will find an example on the next page.

Introduction to Decentralised Finance (DeFi)

Example: Impermanent loss through AMM

Initial Prices	
Token A	$ 100
Token B	$ 100
Future prices	
Token A	$ 100
Token B	$ 500

If $500 of Token A and $500 of Token B are held
-Have 5.00 Token A and 5.00 Token B
-Value if held: $3,000.00

If $500 of Token A and $500 of Token B are provided as liquidity
-Have 11.18 Token A and 2.24 Token B (in liquidity pool)
-Value if providing liquidity: $2,238

With the fact, that the price for a token is created on a decentralized exchange and there are no order books on a DEX, the possibility arises that other traders can perform arbitrage trading. As a result, the **pool loses** value, especially when the price makes **very large jumps**. The **ratio of liquidity shifts,** and you get a **different amount of coins**. Arbitrage traders are nevertheless essential for a DEX, because otherwise you would very often have the problem that you can not trade at the current price of the DEX.

→ Impermanent Loss is 25.4% $(1 - \frac{2{,}238}{3{,}000})$

Introduction to Decentralised Finance (DeFi)

Automated market makers in Stellar

- The AMM was officially implemented according to SEP-18.
- With the fact that Stellar revolutionises the financial market and its infrastructure, the AMMs foster a higher volume of seamless cross-border and cross-currency payments by accessing market liquidity quickly and efficiently.
- The increase of liquidity in the Stellar ecosystem was crucial for expanding the network.
- For minimizing slippage, which is the difference between the expected price of an order and the price when the order is actually executed, bootstrapping is used in Stellar.
- By interacting with an AMM it is not two persons who negotiate the market price, rather a liquidity pool where other people put capital into the Stellar network. Instead of a traditional order book model which is used by Centralised Exchanges (CEXs) the AMM uses liquidity pools and liquidity providers.
- Liquidity providers earn a 0.3% fee on all trades proportional to the share of the pool.
- Here you can provide liquidity with an AMM on Stellarx.

Decentralised Finance (DeFi) on Stellar

Stellar-Polygon Bridge

- A bridge provides the service to transfer tokens and arbitrary data from one blockchain to another. The tokens will be bridged to ensure usability on the other chain.
- The Stellar-Polygon Bridge allows bridging in a safe and fast way to use XLM on the Polygon network.
- From the Stellar blockchain you bring your XLM tokens over to the Polygon blockchain with wrapped XLM (wXLM). The wXLM tokens are changed in a 1:1 ratio and can be redeemed at any time to the XLM network through the bridge.
- An advantage of bringing tokens over to Polygon is to benefit from different use-cases in the Polygon ecosystem such as buying NFTs on an ERC-20 chain or interacting with the DeFi ecosystem on Polygon to increase the variety of trading pairs. This includes the Decentralised exchanges and lending/borrowing in the Polygon ecosystem.
- This facilitates additional trading possibilities and ensures an efficient use of XLM on another Blockchain.

3. Conclusion

Conclusion

Key learnings

- Decentralised finance refers to a specific ecosystem in the blockchain space that enables digital financial services with the use of decentralised exchanges, smart contracts, and automated market makers. Moreover, DeFi requires a non-custodial wallet.
- DeFi gives investors opportunities to maximize returns through strategies across borrowing and lending, staking, yield farming and trading.
- Stablecoins are coins which are backed by real assets such as fiat currencies. This protects the investors from market downturns by reducing the volatility of the cryptocurrency.
- Stellar network efficiency is built on performing transactions at a low cost of 0.00001 XLM and a capability to process 10,000 transactions per second according to the Stellar consensus protocol. Since DeFi attracts a tremendous number of investors, these specifications are important for the Stellar network to gain a competitive advantage in the market.
- The Stellar consensus protocol outperforms other DeFi protocol users by reaching consensus without the need for staking capital which makes it inaccessible for a specific amount of time.
- There are many applications for the Stellar Network which makes asset issuance, remittance and payments easier. Moreover, on the Stellar blockchain there are manifold possibilities to establish new DeFi apps such as the ones which give access to tokenised assets.

Conclusion

Key learnings

- An Automated Market Maker (AMM) is a protocol that interacts with a smart contract in a liquidity pool and its main purpose is to provide liquidity and exchange assets.
- An AMM can be divided into three layers; the first layer is the DEX, the second layer is where the AMM is active and represents the order book and the third layer is the different types of AMMs and how they determine their price.
- It is likely that a risk named ‘impermanent loss’ occurs, where you provide liquidity to a pool and the price of your deposited asset has changed compared to when you deposited.
- As of June, 2021, Stellar officially implements AMM, providing a quick and efficient market liquidity.

References

References

1. https://www.bis.org/publ/qtrpdf/r_qt2112b.pdf
2. https://hedera.com/learning/what-is-decentralized-finance?gclid=Cj0KCQiA8vSOBhCkARIsAGdp6RTs4uP7zJpzLXmaiy9F0nmekPEV0Cn5pE38LvuBk9B04eb426_iFzoaAs9dEALw_wcB
3. https://script3.medium.com/why-stellar-is-the-perfect-blockchain-for-defi-59cc2e590d63
4. https://turrets.stellar.org/
5. https://github.com/ankeliu/awesome-stellar/blob/master/README.md#projects-building-on-stellar
6. https://github.com/stellar/stellar-protocol/blob/master/core/cap-0038.md
7. https://stellar.org/blog/introducing-automated-market-makers-on-stellar?locale=en
8. https://medium.com/cardano-journal/capital-efficiency-can-unlock-the-defi-revolution-af59a090b4dc
9. https://help.coinbase.com/en/coinbase/trading-and-funding/advanced-trading/slippage

Questions?

Contact Us: Stellar Developers Discord

Twitter: @StellarOrg

UNIC | DLRC

Stellar