Building Trust in Decentralised Finance (DeFi): An Educational Case Study of Aave

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How to use the case study

The case study is for use in undergraduate and postgraduate modules on blockchain and Web3. It is an advanced case study and assumes knowledge of the Ethereum blockchain, smart contracts, Decentralized Apps (dApps) and Decentralized Finance (DeFi). The purpose of the case study is not to teach these tools and techniques to students, which should have been encountered already, but to allow students to discuss and think through the implications of them in real environments. The case study is part of the Level3: Web3 Educational Case Studies repository of open source case studies.

For students: The case study should be read in advance of the class. When you arrive into class you should either join your team (if assigned in advance) or wait to be assigned (at the start of class). From there, the lecturer will provide a brief review of the case scenario and deliverables. Individual lecturers may deviate, especially in light of new developments since the case study was written.

For lecturers: This is the *suggested* approach, but you may choose to deviate. Place students into teams as you see fit, but I would suggest keeping each team below five members. Ideally, students should have *45 minutes* to discuss the case among themselves, but you may need to contract this depending on how much time you have available. I have left open how you want to assess any outcomes.

You will need to read the Company Context before the Case Scenario as it includes important details about how Aave functions. However, broadly speaking the case revolves around a presentation your team needs to deliver at the popular ETHDenver conference during a downturn in the Web3 economy. The presentation needs to put forward an optimistic narrative, but must also keep in line with Aave's reputation as authentically Web3.

Company Context

Like many Web3 projects, Aave's story is closely tied to its founder, the Finnish entrepreneur Stani Kulechov. Kulechov, previously a law student, established the company ETHLend in May 2017 as a Peer-to-Peer (P2P) borrowing and lending platform. A user would make a request to borrow ETH and then hopefully find a match with someone looking to lend. This system was a little clunky because often it depended on a "coincidence of wants," that at any one time there were users with similar needs, which at the time was not true. Despite this, ETHLend raised $16.2 million with an Initial Coin Offering (ICO) in November 2017. ICOs were popular crowdfunding mechanisms at the time. A project could raise ETH and offer their own tokens in exchange, with investors hoping that the project would succeed and the token's value rise. ICOs gained an extremely negative reputation for failing to deliver, but ETHLend/Aave is seen as one of the rare success stories of this era.

The Aave Protocol

In 2018, in the depths of a brutal Crypto Winter (an era of negative sentiment), Kulechov rebranded ETHLend as Aave, but this was no superficial makeover. Aave worked for two years on reimagining the borrowing/lending model by introducing liquidity pools to replace the clunky peer-to-peer (P2P) model. Instead of users waiting to be matched with other users, they could instead lend or supply to pools of an asset that other users could then borrow from. Liquidity pools are smart contracts containing tokens supplied by Liquidity Providers (LPs). Liquidity pools, in the Aave context, mean that when a user wishes to borrow or lend ETH they do not have to match with another person. Instead, they can borrow from a liquidity pool containing ETH (or DAI or USDC or UNI). Borrowers provide collateral - overcollateralized - to ensure they return the borrowed funds. Users can be liquidated if their collateral no longer covers the borrowed assets. On the other side, Liquidity Providers (LPs) can supply ETH to the collective liquidity pool and earn interest. It is also possible to create a more complicated Flash Loan, which is a more technically-demanding loan that occurs within a single Ethereum block. The various smart contracts that enable these liquidity pools are known as the Aave protocol. In line with the Web3 ethos, the Aave protocol is open source.

Aavenomics

The process of transitioning from a traditional company structure to a DAO is known as progressive decentralization. Aave started to transition to a DAO structure in January 2020. Progressive decentralization typically begins by distributing tokens to investors, founders, a community treasury, but also, importantly, the wider community, usually airdropped to early adopters and users. The token is then the governance token underpinning the DAO governance process. Aave calls its brand of progressive decentralization Aavenomics and it outlines a plan to replace the traditional company structure of Aave piecemeal by the Aave DAO. The Aave Companies, as they are known, still exist, but are now funded by the DAO and mostly focus their attention on improving the various Aave protocols.

Aave (AAVE) token

The Aave protocol has an associated ERC-20 token known as Aave, with the ticker symbol AAVE. AAVE is what is known as a governance token. Ownership of the token confers rights on holders to vote on matters relating to the Aave protocol. Token holders belong to the Aave DAO, a Decentralised Autonomous Organisation (DAO). DAOs are communities that self-govern using blockchain technologies. AAVE holders can propose changes to the Aave protocol. Proposals generally begin with an Aave Request for Comment (ARFC) or a temperature check on the governance forums. If the AFRC appears to have support it will then go to an DAO polling tool known as Snapshot. The results of a Snapshot poll appear at a certain block on the Ethereum blockchain and act as a transparent signal about where the community stands on the proposal. Finally, if the proposal is accepted, it will then be formalized into an Aave Improvement Proposal (AIP), where it will be added to the relevant governance smart contract, becoming part of Aave DAO's on-chain protocol rules. In some cases, the AIP is a relatively minor parameter change, such as adding a new asset to the Aave protocol, and in some cases the change might be major, such as a change that alters the governance process itself. A set of community-elected Guardians act as a final check on AIPs in case of edge cases, such as hostile actors manipulating the governance process.

Safety Module

A secondary benefit for AAVE holders is the ability to stake AAVE in the Safety Module smart contract. The Safety Module exists to mitigate a Shortfall Event in the Aave protocol that causes a deficit. This could be a bug in an Aave protocol smart contract or the collapse of an asset used for collateral. The Aave DAO would vote on whether such an event had occurred and how to address it. There is also the option to pursue Recovery Issuance where new AAVE is issued because the Safety Module does not cover the deficit. Stakers earn a reward, but on the condition their assets might be sold off in such an event. As an emergency measure there is Backstop to ensure not too much AAVE is sold at any one time.

GHO stablecoin

GHO stablecoin is Aave's stablecoin offering. Stablecoins are cryptocurrencies pegged one-to-one to a fiat currency, such as the US dollar or the Euro. Stablecoins are managed in different ways in Web3. Many of the most popular are associated with centralized entities, such as Tether, where the reserves are held by the company. Others, such as USDC, are managed by a company or consortia in a similar reserve manner. Yet others aim to be decentralized and are typically run as DAOs. MakerDAO, for instance, allows users to borrow and lend its stablecoin DAI through a set of smart contracts, with users providing collateral. DAI is managed by the DAO members through the MAKER governance token, such as setting borrowing rates or penalties. Aave's GHO stablecoin will be mintable against assets held as collateral in the Aave protocol. Borrowers can mint GHO and then repay with interest, which is paid to the Aave DAO. Discounted rates are also available to those staking AAVE in the Safety Module. At launch, the Ethereum Pool Facilitator contract had a borrow rate of 1.5%, a cap of 100m mintable GHO at any one time and a discount rate of 30% for Aave holders. There is also the FlashMinter Facilitator contract that allows users to create flash loans which are complicated transactions that are repaid within a single block, usually taking advantage of an arbitrage opportunity. The Aave DAO will manage the GHO stablecoin, such as setting interest rates on borrowing.

Aave Arc

Aave Arc is Aave's institutional offering. It offers the same borrowing and lending functions of the Aave protocol, but through a separate set of liquidity pools. The original Aave protocol is permissionless albeit certain addresses associated with historical cybercrime are screened. This means anyone can, in theory, use the protocol, without providing any identifying information, such as AML/KYC documentation. From the perspective of the Aave protocol, users are just a public address interacting with the smart contract. However, Aave Arc is a permissioned version of the Aave protocol where users are required to provide AML/KYC documentation, which is important to traditional financial providers. The users in this context are a set of whitelisted companies. Aave Arc is under the broad remit of the Aave DAO, but some of the companies involved, as "Guardians," can veto proposals that undermine the permissioned nature of the system. It appears from data that the first Aave Arc experiment has run its course and it is unclear at the time of writing whether it will continue.

Lens Protocol

In May 2022, Aave launched a Web3 social graph known as the Lens Protocol. Lens is built on the Polygon blockchain, a sidechain of Ethereum, and is designed as a Web3 native alternative to traditional Web2 centralized social media offerings. With Lens, a user can mint a Lens profile and username/handle to their Polygon account. This means the user, rather than a company, owns the profile. The profile is minted as a Non-Fungible Token (NFT) that grants control over the profile, which can engage in certain activities, like following other profiles, making posts, commenting, mirroring (sharing), etc. The experience is similar to traditional media in outline, but with the distinction that the data is user controlled. Lens is an open protocol that allows any developer to extend and add new features, rather than a "walled garden" under the control of a single company. This has enabled the creation of the Lensverse or Lens ecosystem of apps, such as LenTube (similar to YouTube) or Phaver (content curation). Lens represents Aave's first foray outside its traditional financial product offerings.

Useful Resources:

Aave Document Hub.

Aave Financial stats.

AAVE token market capitalization.

Aave Governance stats.

The Case Scenario

In this scenario, the Web3 markets have entered what is known as Crypto Winter. This is a sustained period of economic stagnation decline when mainstream interest about Web3 projects is at a low. The Winter has been caused by the collapse of a rogue exchange, called FBX, that has left Web3's reputation in ruins. Aave is due to present at the popular ETHDenver conference. Your team is what is known as a DAO workstream and exists within Aave DAO. Workstreams are sub-units within DAOs and usually operate with an assigned budget and set of objectives. Your workstream is called Community Relations and the presentation is part of your workstream's objectives.

Your workstream needs to generate optimism about Aave and DeFi more broadly. Students need to come up with a *narrative strategy* that does deviate from Aave's strong reputation as an authentically Web3 protocol. In particular, students must not propose a narrative that violates important Web3 values such as decentralization, permissionlessness, censorship resistance and more besides. The lecturer might add their own.

These terms should be familiar to students at this point, but in a basic sense they mean:

Decentralization: decision-making power should be widely distributed among the community stakeholders.

Permissionlessness: nobody should be excluded from using the protocol.

Censorship resistance: no activity should be censored from the protocol.

Students should not expect to perfectly align Aave with these Web3 ideals. Compromise is a reality within Decentralised Finance (DeFi), but there should be some attempt to stick to the values. Otherwise you risk Aave's strong reputation for authenticity.

Suggested deliverables:

Teams will be asked about their team's narrative strategy for presenting at EthDenver.

Optional: Students could be further asked to actually create the presentation as an assignment, working together outside class, but I do not suggest this is their aim in class since it will distract from the discussion, the main motivation.

The strategy should solve two problems:

First, to remind the audience why Aave is well-positioned to survive the Crypto Winter and what makes it such a well-regard project.

Second, to choose an ending to the presentation that emphasizes one of Aave's products in order to capture the audience's imagination about the future. This could mean the original Aave protocol, the GHO stablecoin, the Lens protocol or Aave Arc. If Aave has created new protocols since this case was written these too could be chosen.

These strategies can be written into a shared document. The lecturer will then call on each group to propose their respective solutions and explain their reasoning. The reasoning is important to show students have thought through why the strategy was chosen. The lecturer will keep in mind to what extent the strategies are authentically Web3 or not.