

AAVE Decentralized Credit Union Protocol

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Abstract

Flaws in the current system for personal credit cards generate a massive social cost, such as expensive handling fees and high interest rates. The revolving interest of credit cards is a cause for poverty among the working and middle classes as credit card debt in developed countries reaches trillions of dollars. Bank institutions supervise personal lines of credit when such finances are in fact our savings. Furthermore, these institutions must collect data on individuals in terms of employment, income, insurance, asset, and shopping records, yet leakage of personal data continues to occur.

On the basis of a smart contract, we propose a Decentralized Credit Union Protocol (DCUP) for people to build basic social credit based on their social circles. No third party credit rating would be required to provide a safe, highly competitive, and transparent credit financing market with low handling fees. The credit would be instantly available for exchange into cash or cash advances. This compensates for the high costs and inconveniences of personal credit financing in the flawed credit card system.

Introduction

Personal credit is established on an individual's social reputation, which can be extended from the knowledge and trust of friends and colleagues to even broader areas. If social reputation can be calculated into an asset price, then social credit can be generated to provide everyone a line of credit that can be converted to cash whenever needed. This is the concept behind the DCUP - Decentralized Credit Union Protocol.

The DCUP is an inclusive financing credit transaction protocol that can protect personal information without relying on third party credit ratings. The basic principle is that everyone can deposit Stable Coins into a smart contract for staking and offer credit lines via friend lists. Such mutual credit extension gives everyone in the friend list a credit line and instant financing access without requiring credit rating from a joint credit information center or bank institution. In this way, the security of personal information is maintained while inclusive financing can be simultaneously achieved to satisfy personal needs for instant credit transactions and financing.

Unlike traditional credit financing, the DCUP is based on social reputation rather than P2P lending. Social reputation is reflected through digital identities. Let's imagine that everyone has a digital identity representing his or her social reputation among the friend lists in our communications or social media software. Social reputation must be acquired from the trust of friends rather than third party credit rating algorithms, as this trust comes from actual credit extensions among different friends. During the process of credit extension, an individual must deposit Stable Coins into a smart contract for staking before the credits can be freely extended to each friend based on self-determined interest rates, credit limits, and terms.

Individuals with good social reputation can use the credit lines at any time, just like having a virtual credit card for cash advance or credit loan. Needless to say, individuals who are not trusted by their friends will not be able to receive credit extensions and thereby excluded from using the credit lines.

Credit grantors use DCUP because they are motivated by the interest revenue from credit financing. Just like the principles behind credit cards, individuals with good social reputation can make payments through personal credit lines or obtain credit loans at any time. An interest will be charged if the principal is not amortized within the allotted time. Overdue interests will affect personal social reputation and generate warnings via friend list digital identities, preventing the users from continuing to use this virtual credit.

Social reputation is based on the trust of friends. Despite the lack of a lending relationship, we believe that most people will maintain their social reputation for the benefit of continuing to use the DCUP credit financing service. This is primarily because social reputation offers a low interest rate, with acquisition and user costs far lower than that of credit financing services at traditional financial institutions. In addition, social reputation is fairly important throughout an individual's career and workplace development. Different from typical financial credit investigation systems, social reputation-based digital identities are visible to friends in the contact lists. Once a warning is generated, it will also impact an individual's trustworthiness in social circles.

Currently, the most prevalent mechanism for credit cards is also a type of basic social credit. However, this basic credit is not based on social circles and social communities but rather on the personal credit extension mechanisms by international membership organizations like VISA, MASTER, and other member bank institutions. In developed countries with numerous bank institutions, students and workers can easily apply for personal credit cards as long as they have a regular job. However, these credit cards are not inclusive as they are underlied by high operational and consumer costs. Stores that accept credit card payments need to pay a transaction fee of 2.5%-3.5% or more, while consumers must pay a credit card revolving interest of 14% to 30% or more, including marketing costs for other financial products. Clearly, the convenience from over three decades of credit card development comes at a high cost to society and the general public.

Bank institutions adopt the same mechanism for personal credit loan services by conducting detailed personal background checks and ratings before granting credit limits. When there is need for a cash advance or loan, users may withdraw an amount of cash within the given limit as the bank starts collecting the interest and principal according to the terms. Despite the conveniences of this traditional credit financing mechanism, they also come at a massive social cost - some of the interest is deceptively hidden in handling fees to people who desperately need credit financing.

In recent years, the development of new P2P lending platforms has not really resolved any issues because they still require institutions to conduct personal credit checks. The risk of such systems lies in a mutually unknown lending relationship. Whether the loan is provided by an individual or a third party bank-like institution, this lending risk cannot be fully eliminated and escrow funds are often misused. That is why many P2P lending companies end up with bad debts or close down due to poor management. Such inability to compete with traditional financial institutions in credit financing may even lead to other social issues, such as loan sharks and violence in debt collection.

The DCUP is short for "Decentralized Credit Union Protocol", which is a type of basic social credit system for individuals that can create a more efficient credit trade market for everyone to extend credits to well-known friends while earning revenues on interest. Credit limits may also be extended to access convenient credit financing at any time. The credit grantor can determine the credit allocation principles, including the size and interest of a credit line for trustworthy friends. As for the credit recipient, the system will automatically start from a credit line with the lowest interest rate. In addition to enabling people to automatically close credit trade agreements through blockchain technology without relying on traditional credit rating institutions, this can also protect personal privacy and social information security. Furthermore, interest rates also become more transparent, benefiting the public through market competition.

Social Reputation System

Encompassing corporate and personal credit, social credit systems are common in developed countries. In the United States, the system operates through "credit intermediary institutions" based on the government's supervisory regulations and management with economic benefits as the orientation. In Europe, public credit investigation institutions are led and established by the government and Central Bank, requiring corporations and people to provide data for the purposes of providing protection under the law.

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Personal credit systems dominated by credit intermediary institutions inflict a high cost on society. Whether by the government or people, personal data may be easily misused. In authoritarian states, these systems have also become tools to monitor citizens.

The Social Reputation System proposed as part of the DCUP does not operate via credit intermediary institutions or save any personal data. The credits are calculated by mutual credit extensions through personal social networks, eliminating the possibility of any human intervention on the social credits of others.

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DCUP Advantage

1. Transparent and Competitive Interest Rates

The interest rates are determined by the credit grantor. The credit applicant starts with credit lines offering the lowest interest rates. Everyone can extend credits to their trusted friends and provide credit limits at specified interest rates.

1. Transaction Cost

The transaction cost only involves gas fees. The DCUP will deduct a certain percentage from the interest revenue of credit grantors to ensure sustainable development of the DCUP community.

1. Privacy Protection

No intermediary credit rating or other third party institution is required for the protection of personal data.

1. Risk Control

The DCUP targets small amount credits to satisfy the economic needs of the middle class and below. The maximum credit limit for an individual will ultimately be controlled by DCUP community governance. During the initial phase of development, the social reputation for everyone will be kept within a typical credit card limit, such as a maximum credit limit between \$2,000 USD and \$10,000 USD, or an estimate based on the local national income and GDP criteria.

Credit grantors may have direct control of their risk tolerance. For example, staking \$1,000 USD worth of Stable Coins, the extensible credit limit might be \$1,000 USD. By evenly splitting \$1,000 USD to 10 well-known friends, the risk of bad debt for the credit grantor is \$100 USD/person.

The DCUP is decentralized in nature with a built-in risk diversification mechanism. Each friend list serves as a credit union free from the issue of central depository funds by central authorities and any systematic risks caused by massive bad debts.

1. No Lending Relationship

Lending relationships are replaced by social reputation combined with personal digital identities. When one or more credit grantors assign a credit limit to recipients, a personal credit pool is formed through which the sources of credit and identities of grantors remain anonymous to the recipients. When credit recipients use credit financing, they pay the principal and interest to the personal credit pool rather than the credit grantors. The normal operation of personal credit pools indicates a good social reputation, whereas overdue interest would affect such social reputation.

1. Self-Improvement

The DCUP is a system that continuously improves because everyone's social circle is a mechanism for self-improvement. Social relationships are founded on trust developed from general understanding and interaction, as people would naturally steer away from friends with whom there is no shared trust.

The credit limits given by credit grantors may vary due to different levels of trust. No one would extend credits to unfamiliar friends who do not have regular employment. Moreover, personal social reputation will be reflected in social circles. When social reputation is impacted, it will not only affect the convenience of using DCUP, but also the personal social reputation in social communities.

DCUP Challenge

1. The Feasibility of Replacing Lending Relationships with Social Reputation

It is still unknown whether people would cherish and maintain their social reputations by paying the principal and interest on time in the same way for a credit card.

1. Stable Coin Acquisition and User Experience

To this day, cryptocurrencies, including the acquisition of Stable Coins, remain novel to the general public. Since the DCUP service is specially designed for the general public, a lack of experience with using Stable Coins in personal social circles may hinder DCUP development.

1. Establishing User Digital Identity

The DCUP system needs to prevent anyone from obtaining higher credit limits by using different IDs across different social communities. Therefore the establishment of user digital identity needs to solve this issue by adopting KYC verification methods.

1. Credit Grantors' Loss and Risk Controls

Although the risk of generating bad debts is limited, any losses to credit grantors will definitely affect the credibility of the DCUP, and influence the willingness of new users to extend credit to their social circles. Hence it is necessary to compensate credit grantors by proposing better risk control methods. Some examples of better compensatory measures in breach of contract include appropriating a percentage to the insurance pool or reselling credit debts to other financial institutions.

Use Case Sequence Diagram - Credit Flow

Explanation: Alice has two close friends in her friend list: Bob and Eve. Alice deposits 100 USDT into DCUP for staking, and withdraws an equal amount of 100u Credit Points. Alice gives 50u Credits to Bob and Eve respectively. Now Bob and Eve each have 50u of Virtual Credits.

When Bob and Eve use Virtual Credits and exchange 50u for USDT, they must deposit 50u in USDT within the allotted period (just like credit cards) or they need to pay the revolving interest to the DCUP. Bob and Eve choose not to return the

50u for the time being and pay the revolving interest. Hence Alice receives the interest from the DCUP.

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Use Case Sequence Diagram - My credit limit from social network

Explanation: Alice, Bob, and Eve are close friends. Alice deposits 100 USDT into DCUP for staking, and withdraws an equal amount of 100u Credit Points. Alice gives 50u Credits to Bob and Eve, respectively.

Bob deposits 200 USDT into DCUP for staking, and withdraws an equal amount of 200u Credit Points. Bob gives 150u to Alice and 50u to Eve.

Eve deposits 100 USD into DCUP for staking, and withdraws an equal amount of 100u Credit Points. Eve gives 50u to Alice and 50u to Bob.

Alice's credit limit from social network = 200u

Bob's credit limit from social network = 100u

Eve's credit limit from social network = 100u

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Credit Limit

Since the available credit limit for each person is determined by his or her social circle, the varying sizes of personal social circles lead to different levels of credit limits. To stabilize everyone's credit limit and prevent it from fluctuating due to changes by credit grantors, the DCUP system adopts two types of measures.

1. A Fixed Upper Limit

No matter how many friends a person has, the available credit limit is fixed at a total amount between \$2,000 USD and a maximum upper limit of \$10,000 USD—just like the limit of a credit card. In the future, this credit can be determined by community governance with varying upper limits based on national GDPs.

For example, Bob's credit from social circles amounts to 20,000 USDT. The credit has an upper limit of 10,000 USDT, hence Bob is only entitled to use 10,000 USDT for both consumption and cash advance in reality.

1. Staking Lock-Out Period

When credit grantors stake USDT to the DCUP for credit points and extend credits to the friends in their social circles, there is a lock out period of at least 3-6 months. During this period, credit points cannot be withdrawn in order to maintain credit limit stability.

As an example, Alice gives Bob 1000u Credit Points (equal to 1000 USDT). Perhaps Bob does not use the credits and Alice finds the revenue to be not as expected. She wants to withdraw the 1000u credit limit and give it to Eve instead. Due to the restraint of the staking lock-out period, Alice must wait for three months before she can withdraw the credit.

Conclusion

Since everyone's basic social credit can be established on top of social community frameworks, we believe there is still a large room for the development of Social Finance. Today, small personal trusts can be established at low costs through smart contracts. Based on individuals, small-scale bank services can now achieve what could not be imagined in the past. Indeed, personal credit financing is an application full of great potential.

To rectify the shortcomings of traditional credit cards, we offer personal virtual credits through the DCUP, which is not only

more reasonable and effective, but can also be settled instantly. This proposal is applicable to any country regardless of the prevalence of existing financial services. To advanced countries with high levels of credit card debt, this proposal becomes an alternative solution for social communities to resolve these debts. Through the spread of social software, the DCUP would be able to quickly penetrate the market, establish social reputations, and realize a future for decentralized financial services.