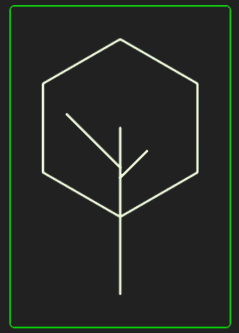


Double Dabble

A decentralized double opt-in protocol for credit score

Ethereal Virtual Hackathon 2019
Consensys Labs Relay Challenge

Preview

The use of credit has been in existence since the dawn of civilization, and it has also been the basis on which relationships were formed, decisions made, and solutions reached. Credit systems exist all around the world, as a country or people cannot function effectively without a system to solve problems of borrowing and lending for its financial institutions. Credit systems vary by name but their modus operandi is similar, innovative future solutions for one could be a solution for most, if not all.

This presentation is not aimed at reinventing the wheel, but to provide possible methods for how **Double Opt in Credit** (determined by both lender and borrower) can upvote an individual's score and reputation, thereby making both parties a determinant in how credit is disbursed.

Introduction

How the current credit score works?

Credit score worldwide

- Credit score is based on credit reports
- Lenders use credit score to see the evaluate the risk of the counterpart, to calculate the interest rate and eventually limitations
- Currently works as a *trusted system:* the credit score is analyzed before authorizing the credit
- Score is based on a number of factors (mostly historical): age, income, previous credit history, etc...

Credit score in US

- Main players: Equifax, Transunion, Experian
- Credit score is developed by FICO (publicly traded company)
- Data is shared between all the credit bureaus
- Citizens can get limited free credit reports but not credit score for free (there is a fee for credit score)

Why was it done in this way?

- Lenders are looking to maximize revenue by limiting the risk of insolvency and increasing interest rates for higher risk counterparties
- Credit bureaus main purpose is to provide creditors the information they need
- Historically, central credit bureaus were needed to collect data from different sources: banks, telcos, insurance companies, and governments to create a standardized credit score
- Before credit bureaus, consumers could default on financial obligations and there was no way for others to determine that the consumer was a credit risk

Main issues / limitations

- Score calculations are not transparent, and individuals do not have visibility for their own score
- Individuals can’t directly contribute to the data used for the credit score
- Few data providers can participate in the credit score (i.e. ecommerce, social network,...)
- If there is an error on the credit report, individuals can contact the credit bureau, but it usually takes 30-45 days to get an answer
- Every country has a different model / players / score
- Centralization of personal data leads to security issues (2017 Equifax data breach)
- Credit bureaus first purpose is to protect only creditors
- Current credit score has a huge impact not only on getting loans but in many other aspects (dating, hiring)

Problem

User Case Example

- Mario is a college student. He’s learned coding in his spare time. He’s looking to be a freelance front-end developer.
- He has less than USD2k in the bank account.
- He needs ca. USD10k to start (buy a new laptop, pay the rent, have a positive cash flow for the next months before he gets his first clients…)

Current Alternatives: Bank / Financial Institutions

- Mario goes the bank and asks for a loan
- The bank starts a credit valuation to 3rd parties. Mario has no control on what they will check and which information they will gather
- Current credit score for Mario is very low. No job, no credit history,...
- Mario will get a high interest rate, or need a guarantee from 3rd parties (i.e. parents)
- Current credit score is mostly based on historical data, or current salary
- Mario has no control on his credit score at all

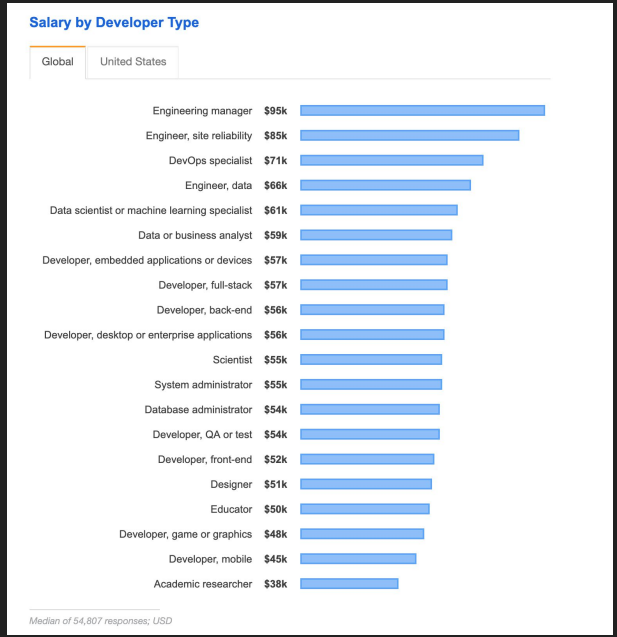
Current Alternatives: Open Finance / Crypto Lending

- Main players: Dharma, Compound, ETHLend, MakerCDP, SALT
- Currently, their focus is on Secured Lending with cryptocurrency used as collateral
- Mario can’t get a loan unless he owns sufficient cryptocurrency for collateral

The system needs revision

Mario should be evaluated for his ability to repay in the future:

- He's young
- He's about to start working in one of the most highly paid industries: coding
- He's very good in coding React and Go: 2 of the most requested skills
- He's healthy
- Mario should be able to choose which data really matters for his future life: motivations, technical skills, job opportunities
- ...

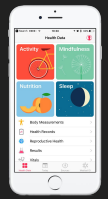


Can Mario HAVE VISIBILITY on a PREDICTIVE ANALYSIS made to assess

the probability that will repay his debt in the future?

How can we fix it?

Give Mario the POWER TO INCLUDE trusted 3rd parties who can provide useful data to make predictive analysis



- Github / Gitcoin / StackOverflow: prove which skills Mario is using and how valuable they are
- University results
- Health stats from wearable devices
- And many others...

Is anyone working on solving this?

Bloom

Bloom is a blockchain solution for secure identity and credit scoring.

Bloom generates a unique credit score for each user.

Focused on identity attesters (data provider who can contribute to credit score)

uport

Uport: Open Identity System for the Decentralized Web

Allows users to to register their own identity on Ethereum

As of today, there is no direct application to credit score

COLENDI

Colendi: Blockchain based credibility evaluation and global identity for the sharing economy

Integrates data providers to build a global Colendi Financial Passport

Use case: Microcredit

Product Market Fit

Where we focused

Industry: Consumer Lending

Target: Lenders.
Even though the main problem is faced by Individuals/Borrowers, we believed that the first target to test are the lenders. Our solution needs to be integrated by the lenders first, and then subsequently used by individuals

Potential Early-Adopters: Open Finance players.
They are already changing the orthodoxies of the current financial system. They are open to accept innovative solutions and provide immediate feedback to let the whole ecosystem grow

Test 1

We started to analyze the current credit score systems in the blockchain space to see if there is already a technology we can use to build a double opt-in model that includes predictive data

IDENTIFICATION

- uPort: currently is not focusing on making a credit score
- Bloom: focused on credit score but it’s not entirely open at the moment. We can’t build a custom credit score model on top of it, but only use the Bloom Global Credit Score for the user

PROTOCOL

- Dharma: The protocol could be used to build a custom model on top of it. We can act as underwriter

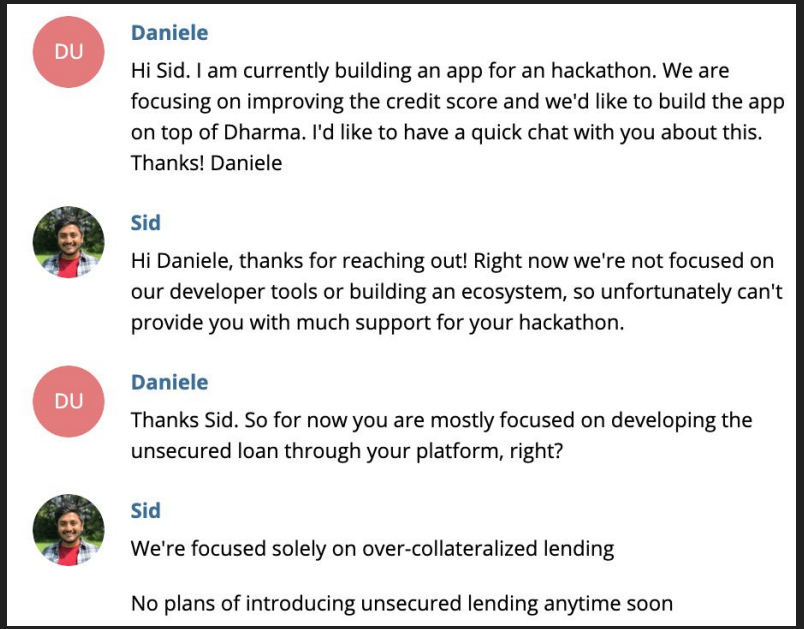
Test 1 Validation

Hypothesis

Build a dApp on top of Dharma, as an underwriter. The goal is to make a predictive credit score model that acts as an underwriter for Dharma ecosystem

SME

We got in contact with Sid Ramesh (head of growth of Dharma) to validate the hypothesis



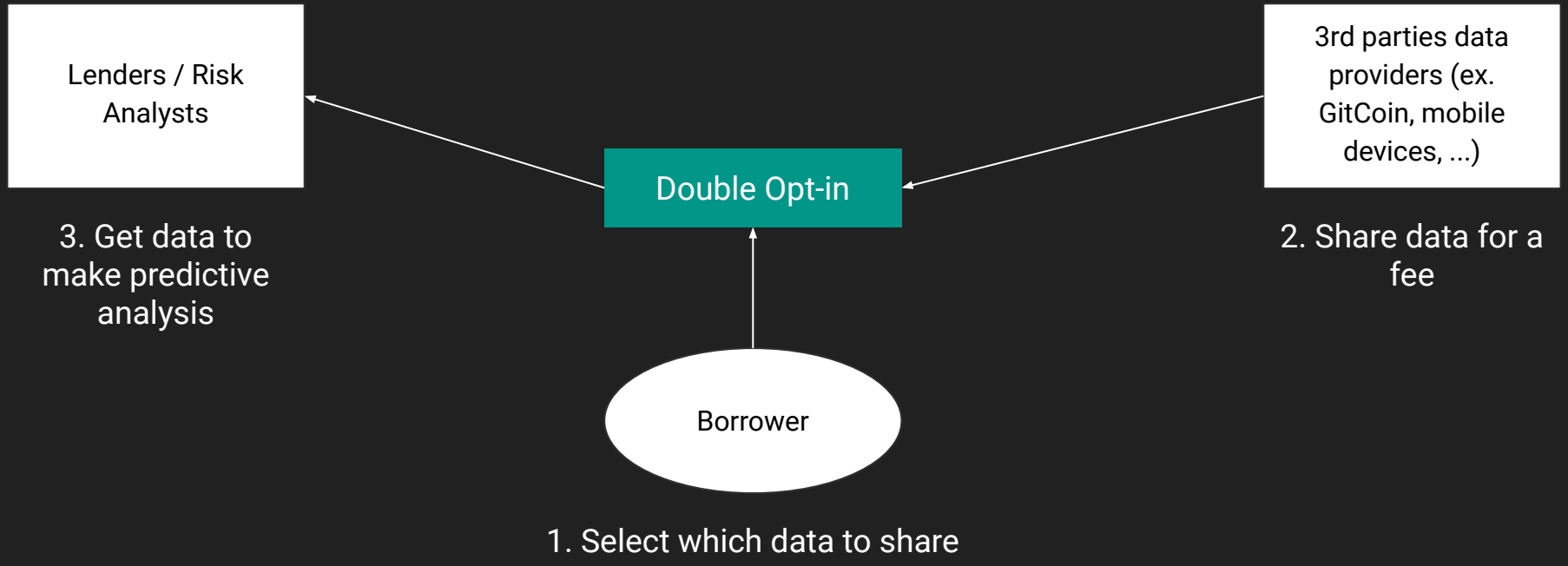
Test 1 Conclusion

- Dharma is only focused on secured loans
- There is no interest in building the Dharma ecosystem now
- Credit score is currently not required in their model

NEXT STEPS

- Could we build our own protocol?
- How the protocol will work?
- Are there any potential partners for using a custom protocol?

Test 2: Basic flow to test



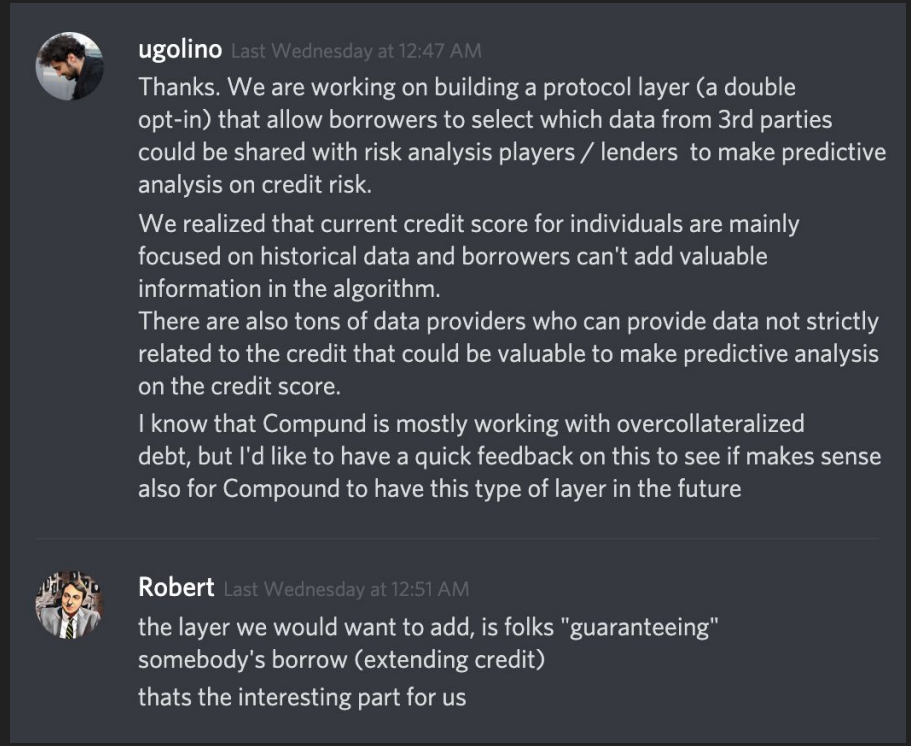
Test 2 Validation

Hypothesis

Build a protocol layer (a double opt-in) that allows borrowers to select which data from 3rd parties could be shared with risk analysis players / lenders to make predictive analysis on credit risk

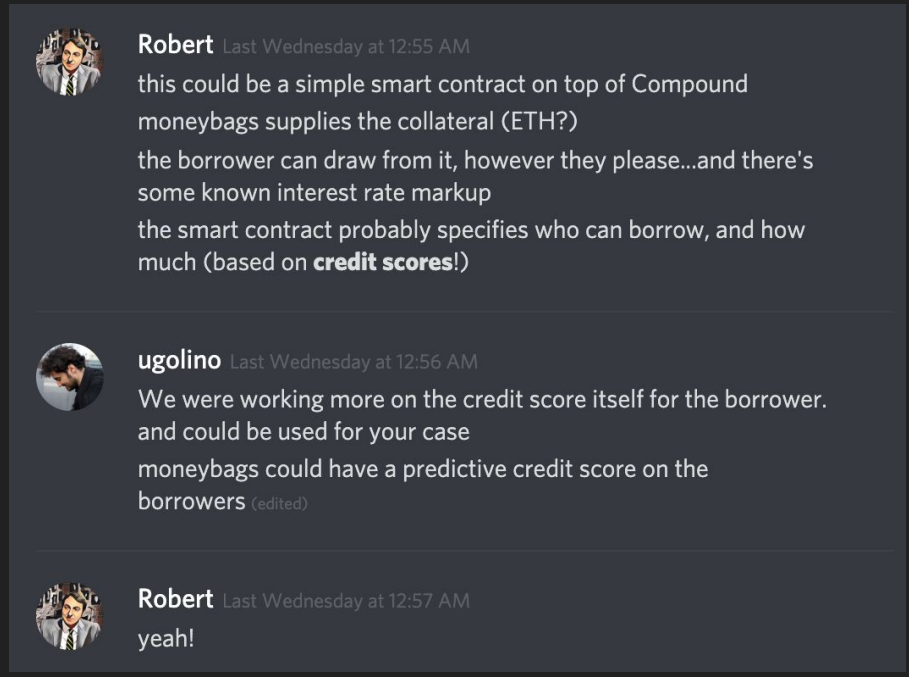
SME

We got in contact with Robert Leshner (CEO of Compound) to validate the protocol



Test 2 Conclusion

- Extended credit is the first application of credit score system in the crypto lending. This will be impacted in the next 6/12 months
- Compound is looking for an external provider of the score system
- Robert also shared with us some confidential information that is extremely useful to show that the potential in the market for a protocol is high



Test 3 Validation

Hypothesis

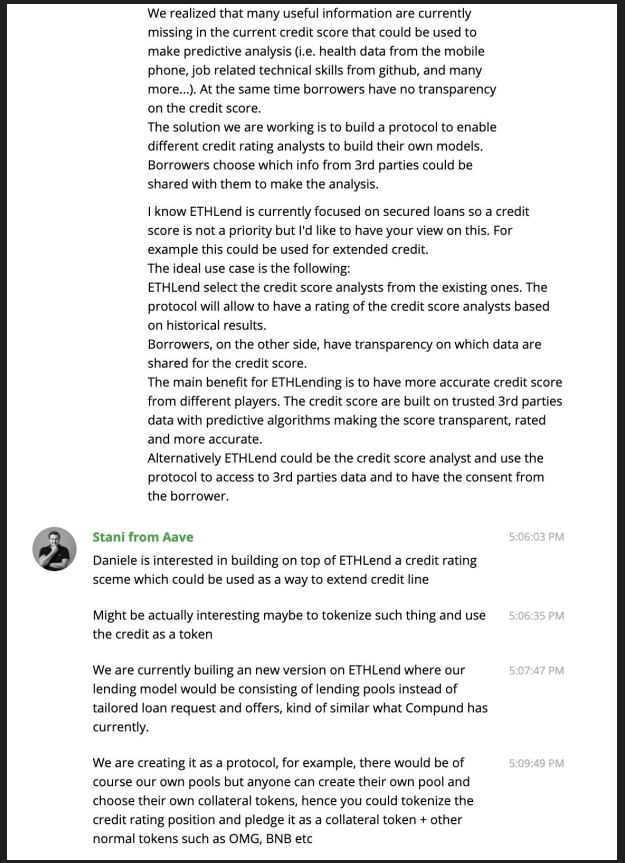
Build a protocol to enable different credit rating analysts to build their own models.

Borrowers choose which info from 3rd parties could be shared with them to make the analysis.

The credit score will be used for extended credit

SME

We got in contact with Stani Kulechov (CEO of Aave / ETHLend) to validate the protocol / use case



We realized that many useful information are currently missing in the current credit score that could be used to make predictive analysis (i.e. health data from the mobile phone, job related technical skills from github, and many more...). At the same time borrowers have no transparency on the credit score.
The solution we are working is to build a protocol to enable different credit rating analysts to build their own models. Borrowers choose which info from 3rd parties could be shared with them to make the analysis.

I know ETHLend is currently focused on secured loans so a credit score is not a priority but I'd like to have your view on this. For example this could be used for extended credit.
The ideal use case is the following:
ETHLend select the credit score analysts from the existing ones. The protocol will allow to have a rating of the credit score analysts based on historical results.
Borrowers, on the other side, have transparency on which data are shared for the credit score.
The main benefit for ETHLending is to have more accurate credit score from different players. The credit score are built on trusted 3rd parties data with predictive algorithms making the score transparent, rated and more accurate.
Alternatively ETHLend could be the credit score analyst and use the protocol to access to 3rd parties data and to have the consent from the borrower.

Stani from Aave 5:06:03 PM

Daniele is interested in building on top of ETHLend a credit rating sceme which could be used as a way to extend credit line

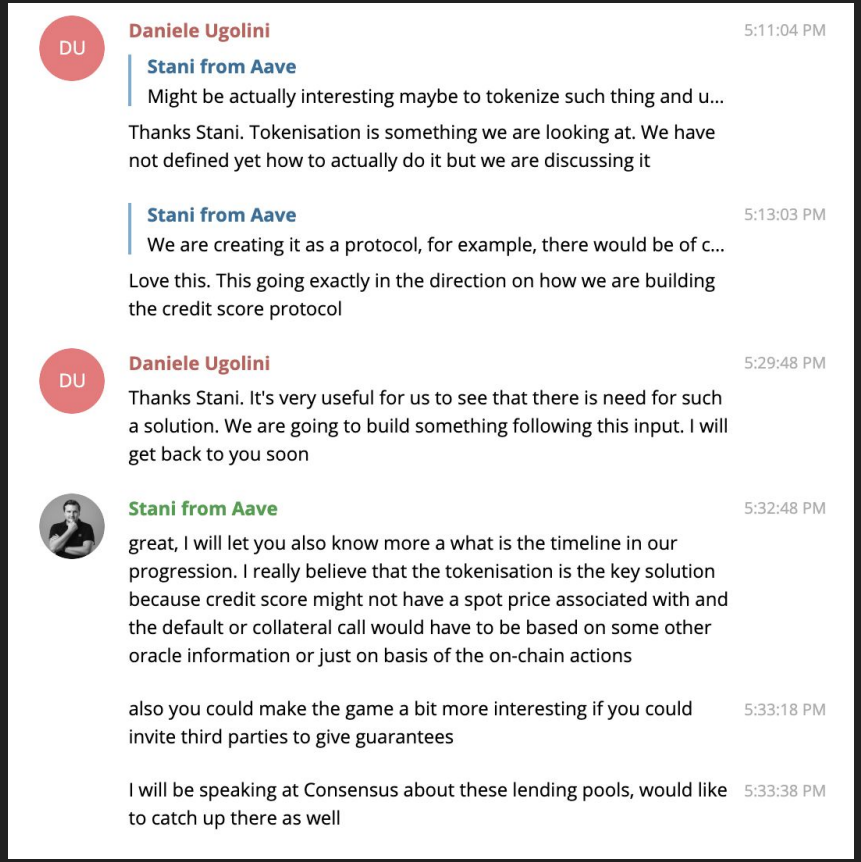
Might be actually interesting maybe to tokenize such thing and use the credit as a token 5:06:35 PM

We are currently builing an new version on ETHLend where our lending model would be consisting of lending pools instead of tailored loan request and offers, kind of similar what Compund has currently. 5:07:47 PM

We are creating it as a protocol, for example, there would be of course our own pools but anyone can create their own pool and choose their own collateral tokens, hence you could tokenize the credit rating position and pledge it as a collateral token + other normal tokens such as OMG, BNB etc 5:09:49 PM

Test 3 Conclusion

- There is a need for the credit score protocol
- The credit score could be designed as a token and could be used as collateral for the loan. The credit score will have a market value.
- Interesting input for the future: 3rd parties guarantees



The solution: Double Dabble

Use case (1st release): Individual credit score for crypto loans (extended credit / lending pools)

Potential partners / clients: Compound / ETHLend

Solution: A decentralized double opt-in protocol for credit score that enables rating analysts to build predictive models based on 3rd party data. The protocol allows borrowers to select which 3rd party data to share for the credit score calculation. The resulting credit score will be tokenized and pledged as a collateral

Benefits:

- Data quality improvement
- Better credit rating
- Better risk pricing
- Reduce time to get the credit score
- Cost reduction
- Assign a market value to credit score

Why Blockchain?

Blockchains are required to create a transparent protocol focused on data privacy and security.

In addition, the Ethereum blockchain could allow us to accomplish:

- Credit score tokenization
- Borderless & global application
- Public access
- Transparent, decentralized storage of scores
- Transparent, decentralized arbitration process
- Transparent, decentralized secure data storage
- Automated trade negotiation / smart contract enforcement

How does the protocol work?

Borrowers

WHO ARE THEY?

- Individuals looking to get short term financing
- Small enterprises looking for short term financing

MAIN INCENTIVES TO USE DOUBLE-DABBLE

- Get a loan quickly at a reasonable rate
- Have control on the score credit
- Potential to increase their score

Credit Score Requesters

WHO ARE THEY?

- Companies like: Compound, ETHLend, Banks.
- Individuals lending in a P2P scheme

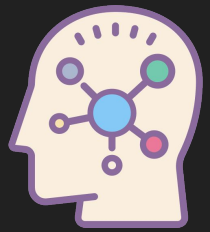
MAIN INCENTIVES TO USE DOUBLE-DABBLE

- Minimize the risk of the loan
- Get an interest rate that represents the real risk of the borrower's default

Rating Models

WHO ARE THEY?

- Entities who build the algorithms for credit score
- Rating agencies
- Lenders could also make the rating algorithms
- Machine learning models



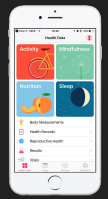
MAIN INCENTIVES TO USE DOUBLE-DABBLE

- Get paid to offer the credit score service
- Increase their market reputation

Data Providers

WHO ARE THEY?

- Any data provider who has valuable information including;
  - Social Networks
  - Financial Applications
  - Ecommerces
  - Wearables
  - ...



MAIN INCENTIVES TO USE DOUBLE-DABBLE

- Get a fee to “sell” user data on user consent

Credit Score Double Opt-in Schema

Credit Score Requester

1. REQUEST credit score to Rating Models (Smart Contract)

10. GET credit score token as a pledge

Rating Models

2. ACCEPT request from credit score requester

3. REQUEST access to data to Borrower (smart contract)

9. ANALYZE data and RETURN the credit score and ISSUE the token

Double dabble Protocol

Data providers

7. ACCEPT request from borrower

8. RETURN data to rating models

Borrower

4. ACCEPT request from rating models

5. SELECT which data share from 3rd parties

6. REQUEST data to 3rd parties providers (smart contract)

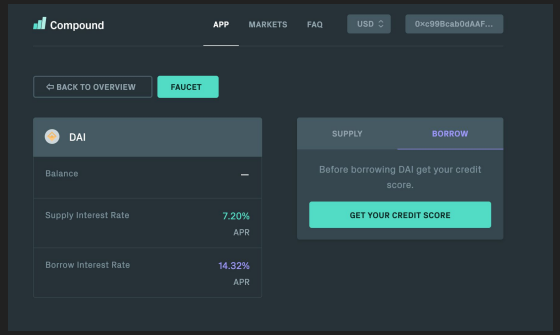
Credit Score Double Opt-in Basic Flow

1. Mario (BORROWER) is looking to get a financing (Extended Credit) with Compound (LENDER)
2. Compound (LENDER) send a credit score request (pay a fee) to the rating agency (RATING MODEL)
3. The Rating Agency (RATING MODEL) accept the request
4. The Rating Agency (RATING MODEL) send a request to Mario for the data they need
5. Mario (BORROWER) select and approve which data from 3rd parties (DATA PROVIDERS) share with the Rating Agency (RATING MODEL)
6. 3rd parties data (DATA PROVIDERS) share the data (get a fee) requested with the Rating Agency (RATING MODEL)
7. Rating Agency (RATING MODEL) analyze the data (i.e. machine learning) and generate the credit score for Mario
8. Mario (BORROWER) receive the credit score and approve to pledge the Double dabble Credit Score Token as a collateral for the debt
9. The Double dabble Credit Score Token is sent to Compound (LENDER) and the load disbursed

Product

Borrower’s Journey

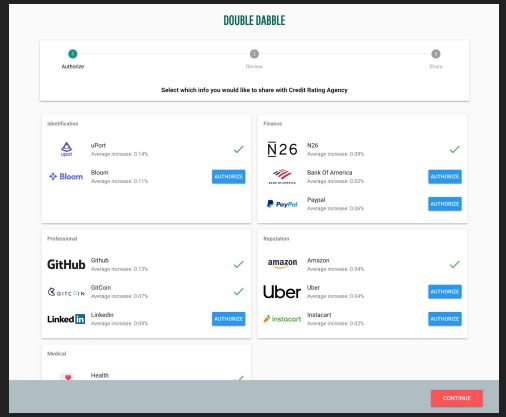
Lender



Borrower asks for an extended credit loan

Credit score will be required, and borrower is redirected to Double Dabble

Double dabble



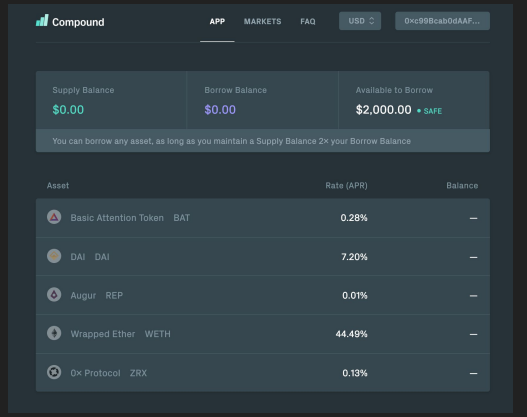
Borrower chooses which 3rd party data to share

Borrower approves the credit score

Credit Score Token issued

User redirected to Lender website

Lender

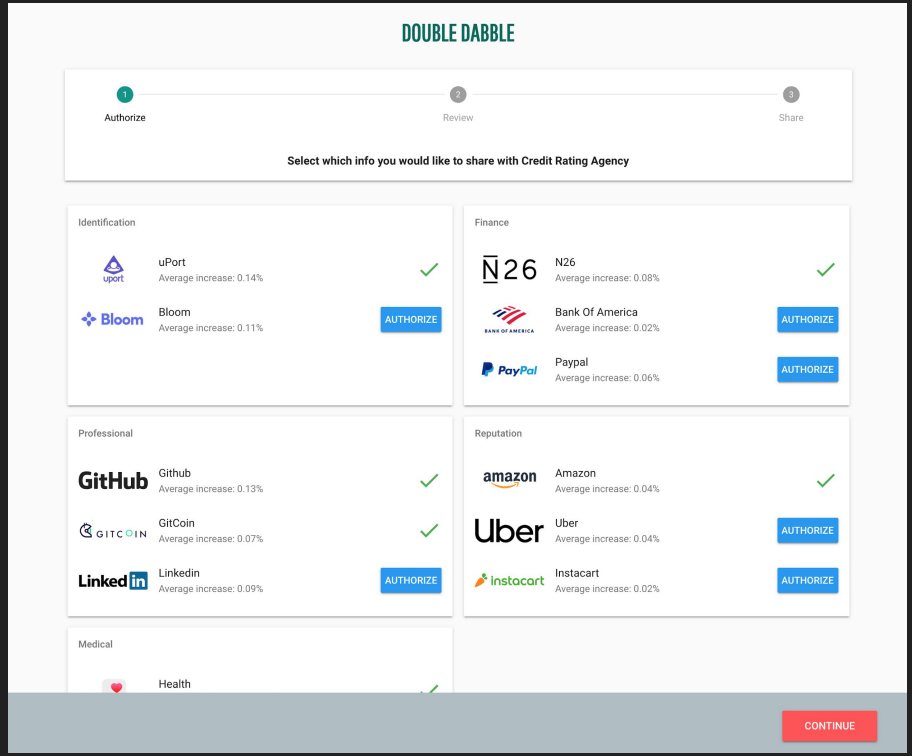


Borrower get the interest rate based on the credit score

The token is pledged and the loan disbursed

Prototype

- We built a prototype focused on testing the user experience flow from a BORROWER perspective
- We are using the prototype to show to potential partners how the technology will work and will be integrated in their current stack



Prototype Details

LINKS

- Demo: https://zealous-poincare-c9d4a4.netlify.com/
- Github: https://github.com/ugolino/double-dabble

LIMITATIONS

- The 3rd parties are just a sample to give an idea on the opportunities
- The 3rd parties are not integrated yet
- Final score is a random number

MAIN FEATURES

- Allow the BORROWER to directly select each data providers to include in the credit score analysis and have full transparency on the final score
- We included a smart contract to generate the credit score token that can be used as pledge for the loan

Conclusion

Main challenges faced during the #buidl

Build a self-sovereign identity from scratch? We decided that there is no point to do it considering there are many players going on that direction. We can use their identity and improve the credit score with our protocol. Or, even better, our protocol could be integrated in their credit score mechanism

Build on top of Dharma? Dharma as a company is not focusing on building the protocol and the ecosystem at the moment. Build on top of that protocol could be risky since could get outdated and there will be no real incentives for contributors

Where do we find rating agencies to build on top of Double Dabble? Rating agencies are entities who build rating models to make predictive rating analysis. Existing rating agencies / credit bureaus might be reluctant to build for this protocol. New rating agency approaches could be born with the protocol and the current orthodoxies will be disrupted. Double-dabble could also act as a Rating Agency and build a model on top of the protocol in order to facilitate the growth of the ecosystem

Potential

We tested the protocol on a specific user case: crypto consumer lending for the Open Finance players. This industry is growing exponentially and from our analysis we had proof that our solution is needed in the next 6-12 months.

The protocol could impact also other industries such as: Investments, ABS, Insurance, SMEs financing, global credit profile, health care… The protocol is not industry-specific but has the potential to enable credit rating agencies to make evaluation for different industries.

The vision of the Double-Dabble is to create inclusive financial services for consumers and companies focused on privacy, transparency and security.

Attachments

Current Credit Score Figures

1. More than 50 million adults had no credit score at all in 2015 [Source: Consumer Finance]
2. Roughly 26 million Americans are credit invisible, meaning they have no credit history with a nationwide consumer reporting agency [Source: Consumer Finance]
3. 19 million Americans have credit history that has gone stale or is insufficient to produce a score under the most common scoring models [Source: Consumer Finance]
4. 76% of adults ages 18 to 24 say they never check their credit scores [Source: Financial Maintenance]
5. 47% of employers check an applicant's credit score and history during the interview process [Source: Demos]
6. Your credit score may predict how long you'll be married – the Federal Reserve conducted a study that concluded that the closer the match of two partners' credit scores at the beginning of the relationship, the more likely they are to stay together [Source: Federal Reserve]
7. It's possible to get a mortgage with a credit score of zero through a process called manual underwriting [Source: The Balance]
8. Education level, savings account balance, stock portfolio, employment status, and salary are all not factored into your credit score [Source: MyFICO]
9. If you check your credit for the first time and don't see an initial score, it may take an average of five months before you see a score [Source: Nerd Wallet]
10. Less than 1% of the U.S. population has a perfect FICO score of 850 [Source: CreditDonkey]
11. 12% of the U.S. population has a FICO score below 550 [Source: CreditDonkey]

Rating Models - Feature Set (Standard)

- Annualized Income
- Country of Origin -> Is the country notorious for fraudsters?
- Occupation -> Does the job pay well and it is stable in the labour market
- Liquidity of Assets -> How easily can the person pay the loan back
- Collateral Value -> Can we get the loan back if the person defaults
- Cost of living in City -> The value of the loan is relative to the cost
- Health and Wellness -> A sickly person may incur large medical bills
- ...

Rating Models - Feature Set (Creative)

- Owns an IPhone -> Having an expensive phone implies some degree of wealth
- Debt to Luxury Goods Ratio -> A person who is tempted by luxury goods may fall over into debt
- Gym Membership Participation Rate -> A person who has signed up for the gym but does not go very often may not have good spending habits
- ...

Sources

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