Currency risk assessment for the Aave protocol

AUTHOR	Aave
VERSION	1.0
ACCESS LEVEL	CONFIDENTIAL

Table of Contents

Premise

This document describes the risk assessment and analysis that has been performed on the different currencies that will be listed in the initial release of the Aave protocol.

Version history

VERSION	DATE	AUTHOR	ACTION
1.0	18/03/2019-06-09	EMILIO FRANGELLA	Initial specification
1.0.1	16/10/2019	ALEX BERTOMEU-GILLES	Review – Format – Map

Attachments and related documents

DOCUMENT NAME	DATE	AUTHOR	REASON

1. Introduction

Aave's DLP protocol will be released to the public with the Aave app, marking the start of a new approach in decentralized lending solutions. Some existing products such as Compound are similarly placed in the market, yet Aave's advanced functionalities bring a competitive advantage:

- **Stable rate**: Borrowers may use the variable rate mode, which is similar to current offerings. In addition, Aave will also implement stable interest rates, a new financial tool which tracks fixed rates. The stable rate is rebalanced when it is too far off from current market conditions, such occurrence can be both favorable or costly for the borrower. More details about how the stable rate work can be found in the Aave's DLP Whitepaper.

- **Rate switch**: Borrowers will be able to switch at any time between variable and stable rates.

- **Flash Loans**: Flash loans is an innovative function that allows developers and integrators to borrow, within one transaction, the liquidity of the Aave protocol with no collateral. Flash loans will be one of those decentralized finance (DeFi) building block that developers can use to build arbitrage products never seen before.

This document describes the risk assessment procedure that has been followed to select currencies for the first iteration of the Aave protocol.

2. Evaluated currencies

The selection of a currency has been performed based on the following constraints:

1. Each currency added to the Aave protocol will slightly increase, permanently the gas cost of the borrow and redeem actions.

2. Each currency added to the Aave protocol as collateral increases the protocol risk of insolvency.

3. Every centralized currency added as collateral exposes the protocol to increased centralization risk.

4. Currencies only enabled for deposit and borrowing (not usable as collaterals) present low risk for the protocol.

5. Having volume from different currencies in our lending pools will reduce the risk via diversification benefits.

The following currencies have been considered:

- DAI
- USDC
- TrueUSD
- Tether USD
- SynthetixUSD
- Augur
- 0x
- Basic Attention Token
- Wrapped BTC
- Maker
- ChainLink
- Kyber Network
- Ampleforth
- Decentraland
- Ethereum
- Aave

In the next chapter, we examine the risk of these currencies based on their maturity, their collateralization risk: how safe of a collateral would it be and their centralization risk. We also look at their inception date, the older the currency, the more tested and less risky.

3. Risk assessment

Aave is developed on the Ethereum blockchain, making it hyper exposed to all Ethereum related risks. ETH is the native and oldest currency of the ecosystem; therefore, we consider ETH as the less risky currency.

Aave's native currency LEND is in operation since 2017 yet it has been very volatile through its lifetime. This is the network token and can of course be used in the DLP, the parameters are conservative to manage the risks.

3.1. DAI

Decentralized **Opensource** **Active since December 2017**

DAI is the first decentralized stablecoin built on the Ethereum network. DAI is minted by creating a Collateralized Debt Position (CDP) which requires to stake a certain amount of ETH. Every CDP must be overcollateralized by at least 50% requiring a minimum collateral of 150%. Below this threshold, the CDP created gets liquidated.

Maturity Risk: **Low**

DAI is active since December 2017 and is fully operational. The project maintaining DAI, MakerDAO, is one of the biggest and most well-known projects on Ethereum.

Collateralization Risk: **Low**

DAI has been very efficient throughout his whole life, having sustained multiple ETH price drops. The market is pretty liquid, and it's easy to liquidate a position in case of insolvency.

Centralization Risk: **Low**

DAI presents a very low centralization risk. There are some concerns related to the centralization of the price feed, which is an extremely important part of the system, but overall the system has been functioning quite efficiently until now.

3.2. USDC

Centralized **ERC20 contract Opensource** **Active since October 2018**

USDC is a stablecoin fully backed by US dollars. It is primarily promoted by Coinbase and supported by the CENTRE consortium. Together with DAI, it has been the most relevant stablecoin in the DeFi ecosystem.

Maturity Risk: **Medium**

USDC is active since October 2018 and is fully operational.

Collateralization Risk: **Low**

USDC has proven to be extremely reliable. It has a high number of pairs in multiple exchanges and is widely used for trading, as well as in multiple DeFi platforms as collateral and principal. Liquidity on the market is pretty high, making it easy to liquidate in case of insolvency.

Centralization Risk: **Medium**

As it's backed by real US dollars, USDC is completely centralized. The technology to mint new USDC and hold the backed USD has been developed and is currently maintained by the CENTRE consortium.

3.3. TrueUSD TUSD

Centralized **ERC20 contract Opensource** **Active since May 2018**

TrueUSD is another US dollars backed stablecoin. It's supported by the company TrustToken, which is periodically audited by 3rd parties to ensure that the 1:1 collateralization is maintained. Right now, TrueUSD's usage and diffusion in the DeFi space is limited all though it's supported by multiple centralized CryptoLending operators.

Maturity Risk: **Medium**

TUSD is active since May 2018 and is fully operational.

Collateralization Risk: **Medium**

TUSD is relatively liquid and well supported across multiple exchanges. Its usage in DeFi platforms is limited for the time being so potential demand is hard to assess.

Centralization Risk: **Medium**

As it's backed by real US dollars, TUSD is completely centralized. The technology to mint new TUSD and hold the backed USD has been developed and is maintained by TrustToken with the smart contracts available opensource.

3.4. Tether USDT

Centralized **ERC20 contract Opensource** **Active since November 2014**

Tether is the oldest USD-backed stablecoin. It initially started as an independent currency built on the Omni blockchain, and progressively moved on the Ethereum blockchain, presumably to take advantage of the DeFi ecosystem.

Maturity Risk: **Low**

USDT is the first stablecoin in operation since November 2014.

Collateralization Risk: **High**

Since its inception, Tether has been accounted of multiple insolvency-related rumors. It seems there is no clear auditing routine, and multiple sources stated that there isn't a correct collateralization ratio for USDT.

Centralization Risk: **High**

Tether is controlled by Tether Limited, which is in turn controlled by BitFinex. There are multiple legal investigations on these two companies regarding USDT. Specifically, there has been accusation of illegally manipulating the price of Bitcoin using non backed USDT, as well as legal claims on the usage of the collateralized funds by both Tether Limited and Bitfinex. The procedure to redeem the underlying asset in exchange of USDT is also unclear.

3.5. Synthetix SUSD

Decentralized **Opensource** **Active since May 2018**

Synthetix is a decentralized synthetic asset platform on Ethereum that provides onchain exposure to real world assets. The platform provides trackers of multiple currencies including USD, EUR, GBP, as well as cryptocurrencies like BTC, ETH and BNB which are backed by Synthetix Network Tokens locked in the respective contract.

Maturity Risk: **Medium**

SUSD was launched in May 2018. It is fully operational yet has been used for just over a year.

Collateralization Risk: **Medium**

Right now, there isn't much liquidity available for SUSD on the market and the usage within the DeFi workspace is pretty limited. Additionally, SUSD is backed by the Synthetix Network Token which is quite volatile.

Centralization Risk: **Medium**

Despite being built on a decentralized infrastructure, some security reports have highlighted undocumented functions in the Synthetix contracts that might present a security risk. These functions could allegedly give permission to the project maintainers to manipulate or withdraw the liquidity available within the Synthetix contracts, as well as manipulate user data (balances, debts).

3.6. Augur REP

Decentralized **Opensource** **Active since March 2014**

Augur is a decentralized prediction market platform built on Ethereum.

Maturity Risk: **Low**

Augur is one of the oldest and most trusted projects in the space, starting in March 2014.

Collateralization Risk: **Medium**

REP is one of the first tokens that has been included in DeFi protocols. On Compound it can be used as collateral leading to the locking of an high percentage of the total supply. Despite that, the market liquidity of the REP token is relatively low right now, which can increase the liquidation risk.

Centralization Risk: **Low**

The project is completely decentralized and can continue to function even if the Augur team ceases to exist.

3.7. 0x

Decentralized **Opensource** **Active since October 2016**

0x allows fast and efficient currencies exchanges on Ethereum, in a secure and non-custodial manner through a system of relayers. The token, ZRX, is mostly used for governance and as a utility token throughout the platform.

Maturity Risk: **Low**

0x is one of the oldest projects on Ethereum, helping exchange ERC tokens since October 2016.

Collateralization Risk: **Medium**

The ZRX token is widely used across multiple DeFi platforms and also available on a wide variety of exchanges. Still currently, liquidity is fairly low.

Centralization Risk: **Low**

The project is completely decentralized and can continue to function even if the 0x team ceases to exist.

3.8. Basic Attention Token BAT

Decentralized **Opensource** **Active since October 2016**

Basic Attention Token is an Ethereum based token that was created alongside its home platform, the Brave browser, with more than 5 million monthly users. BAT's main use case is to reward publishers and content creators through tips within the Brave platform, or as payment currency for the Brave Advertisement System.

Maturity Risk: **Low**

BAT is one of the established projects on Ethereum, it is in operations since October 2016.

Collateralization Risk: **Low**

The BAT token is widely used across multiple DeFi platforms and also available on a wide variety of exchanges. The liquidity available is reasonable.

Centralization Risk: **Low**

The platform is decentralized and the main product, Brave, is open source.

3.9. Wrapped Bitcoin WBTC

Centralized **ERC20 contract Opensource** **Active since January 2019**

Wrapped Bitcoin is an attempt to bring Bitcoin on the Ethereum blockchain, by tokenizing real bitcoin which are custodially locked on the Bitcoin blockchain. The project was born in 2018 by the joint effort of Kyber Network, the Ren Project and BitGo.

Maturity Risk: **High**

WBTC has only been available since January 2019, so it has had little time to be tested.

Collateralization Risk: **Medium**

The WBTC is being increasingly adopted in multiple exchanges and DeFi platforms. Redemption of WBTC for the underlying asset requires KYC and a merchant license by the WBTC consortium, and the liquidity on the market is relatively low.

Centralization Risk: **Medium**

WBTC is completely centralized and custodial. The custody is performed by BitGo, a leader in custodian technologies in the blockchain field.

3.10. Maker MKR

Decentralized **Opensource** **Active since 2016**

MKR is the utility and governance token used in the MakerDAO platform responsible for the emission of DAI. MKR is mainly used to repay the stability fee, and for governance purpose. MKR monetary policy is based on a deflationary economy.

Maturity Risk: **Low**

MKR was launched in 2016, before DAI and has been used by a big community.

Collateralization Risk: **Low**

The liquidity of MKR on the market is quite high, with the token becoming increasingly popular in DeFi platforms.

Centralization Risk: **Low**

As for DAI, the MKR token is part of the MakerDAO ecosystem and is completely decentralized and non-custodial.

3.11. ChainLink LINK

Decentralized **Opensource** **Active since 2017**

ChainLink is a protocol that aims to provides a base infrastructure for decentralized oracles. The goal is to allow contracts to fetch data from the real world in a decentralized, tamper-proof manner. The use cases of LINK include payments of oracle fees and as a security mechanism via staking to prevent tamper and fraud.

Maturity Risk: **Medium**

LINK has been active on since 2017.

Collateralization Risk: **Low**

The liquidity of LINK on the market is quite high, and the token is becoming increasingly popular in DeFi platforms.

Centralization Risk: **Low**

ChainLink is non-custodial and opensource, hence presents low centralization risk.

3.12. Kyber Network KNC

Decentralized **Opensource** **Active since September 2017**

Kyber is an onchain liquidity protocol that can be used for a variety of inter-token use cases such as payments, portfolio rebalancing, currency exchanges. KNC, is mostly used for referrals and fee management. It implements a deflationary economy. Lately Kyber is also building protocol governance on top of the infrastructure, that will use the KNC token.

Maturity Risk: **Medium**

Kyber is active and traded since September 2017.

Collateralization Risk: **Medium**

The liquidity of KNC on the market is quite low yet it can easily swapped on the KyberSwap platform.

Centralization Risk: **Low**

Kyber is non-custodial and opensource leading to a low centralization risk.

3.13. Ampleforth AMPL

Decentralized **Opensource** **Active since May 2019**

Ampleforth is an interesting synthetic asset that implements the concept of elastic supply. The supply of AMPL tokens expands or contracts based on the market price, and corresponding offer and demand.

Maturity Risk: **High**

AMPL was only recently launched and has only been active since May 2019.

Collateralization Risk: **High**

The liquidity of AMPL on the market is almost nonexistent at the moment.

Centralization Risk: **Low**

Ampleforth is decentralized and completely opensource, although some part of the protocol (especially the price oracle) might present some centralization risk.

3.14. Decentraland MANA

Decentralized **Opensource** **Active since August 2017**

Decentraland is a project with the goal of creating a virtual world based on the Ethereum blockchain. Users are able to purchase land using the project's token MANA, and the ledger is kept on the Ethereum blockchain, which indisputably demonstrates the ownership of the land.

Maturity Risk: **High**

Decentraland has only been active since August 2017 and the full project has yet to be deployed.

Collateralization Risk: **Medium**

MANA is a well-known currency, with an acceptable level of liquidity on the market and it's listed in multiple high-profile exchanges.

Centralization Risk: **Low**

Decentraland is decentralized and completely opensource.

3.15. Currency Risk Map

Currency	Symbol	Risk		
		Maturity	Collateralization	Centralization
DAI	DAI	Low	Low	Low
USDC	USDC	Medium	Low	Medium
TrueUSD	**TUSD**	**Medium**	**Medium**	**Medium**
Tether USD	**USDT**	**Low**	**High**	**High**
Synthetix USD	**SUSD**	**Medium**	**Medium**	**Medium**
Augur	REP	Low	Medium	Low
0x	0x	Low	Medium	Low
Basic Attention Token	BAT	Low	Low	Low
Wrapped BTC	WBTC	High	Medium	Medium
Maker	MKR	Low	Low	Low
ChainLink	LINK	Medium	Low	Low
Kyber Network	KNC	Medium	Medium	Low
Ampleforth	**AMPL**	**High**	**High**	**Low**
Decentraland	MANA	High	Medium	Low
Ethereum	ETH	Low	Low	Low
Aave	LEND	Low	Medium	Low

The risk map above shows which impact the analyzed currencies. These risks impact how these tokens will be used in the lending pools: whether they can be used as collateral and their network parameters.

The riskier tokens are TUSD, USDT, SUSD and AMPL, to manage these risks, these tokens will not be available to use as collateral. WBTC is also identified as quite risky, however, it allows to BTC which is in high demand. Similarly, we have identified higher risks for MANA, however it is traded on some of the top exchanges and among the most popular projects on Compound's community vote, so it is reasonable to include it. These risks will be taken into account in the calibration of the parameters.

4. Selected currencies with parameters

For every currency that will be listed, the following configuration parameters will be applied:

1. **Currency**: Defines if users can borrow this currency on the platform.

2. **Collateral**: Defines if users can use the specific currency as collateral.

3. **Loan to Value**: The Loan to Value (LTV) ratio defines how much of a certain currency can be borrowed with a specific collateral. It's expressed in percentage: if LTC=75%, for every 1 ETH worth of collateral, borrowers will be able to borrow 0.75 ETH worth of the corresponding currency.

4. **Liquidation threshold**: Percentage at which a loan is defined as undercollateralized. For example, a Liquidation threshold of 80% means that if the value rises above 80% of the collateral, the loan is undercollateralized and could be liquidated.

5. **Liquidation discount**: Discount at which liquidators will be able to purchase a specific collateral.

The following table summarizes the risk evaluation, the selected currencies for the protocol and the currency specific parameters.

Name	Symbol	Currency	Collateral	Loan to Value	Liquidation threshold	Liquidation discount
DAI	DAI	Yes	Yes	75%	80%	5%
USDC	USDC	Yes	Yes	75%	80%	5%
TrueUSD	TUSD	Yes	No	-	-	-
Tether USD	USDT	Yes	No	-	-	-
Synthetix USD	SUSD	Yes	No	-	-	-
Augur	REP	Yes	Yes	60%	65%	10%
0x	0x	Yes	Yes	60%	65%	10%
Basic Attention Token	BAT	Yes	Yes	60%	65%	10%
Wrapped BTC	WBTC	Yes	Yes	50%	60%	10%
Maker	MKR	Yes	Yes	60%	65%	5%
ChainLink	LINK	Yes	Yes	60%	65%	5%
Kyber Network	KNC	Yes	Yes	60%	65%	10%
Ampleforth	AMPL	Yes	No	-	-	-
Decentraland	MANA	Yes	Yes	50%	60%	10%
Ethereum	ETH	Yes	Yes	75%	80%	5%
Aave	LEND	Yes	Yes	60%	65%	10%