AAU
ÅmpleForthGold
Synthetic Gold forged using Ampleforth technology.

AAU Midas Staking

Design Notes.

1. Introduction

The Midas staking functionality is (mostly) contained in the `MidasAgent.sol` and `MidasDistributor.sol` contracts. These contracts are available on our GitHub, or you can search them on etherscan.io.

These contracts used the Ampleforth token-geyser.sol contract as a code-base for their design. However, we have split the single Ampleforth contract into two contracts (details below).

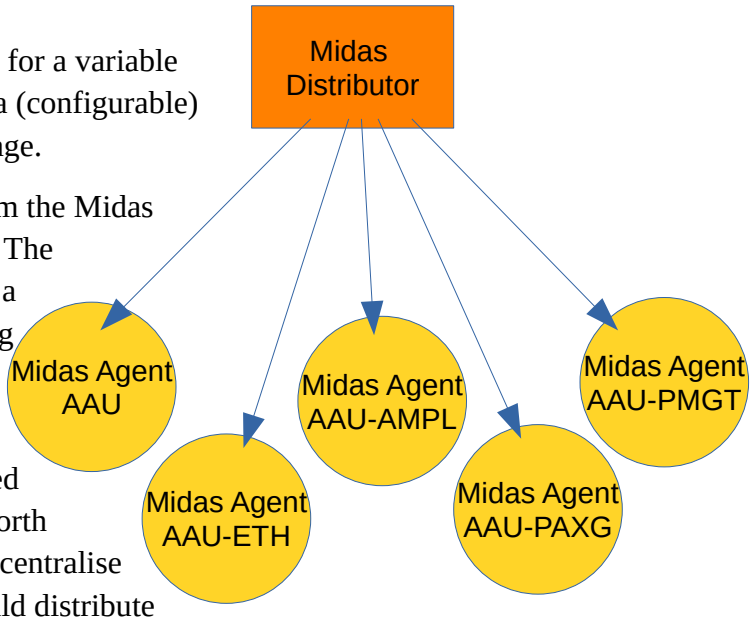
These contracts maintain compatibility with the standard staking interface (EIP900).

We have simplified the design (from the original Ampleforth project) to lower user's gas fees. Several EIP900 functions now have lower gas versions that can be used instead. These lower gas versions have 'lg' at the start of the function name.

2. The Midas Distributor

The Midas Distributor contains all the locked AAU tokens in existence. It regularly distributes these AAU tokens to Midas Agents. The distributor distributes at a rate of 0.5% of the AAU it holds per day.

The distributor is configurable to allow for a variable number of agents. Each agent is given a (configurable) amount of the distribution as a percentage.



Anyone can request a 'distribution' from the Midas Distributor at any time (user pays gas). The recommendation is for users to request a distribute event before unstaking. Doing so will maximise the number of AAU tokens received by the unstake event.

The Midas Distributor is a re-engineered 'locked pool' from the original Ampleforth Geyser contract. It made sense to us to centralise the locked pool in a distributor that could distribute AAU to all Agents (Geysers) in a known, configurable and flexible way.

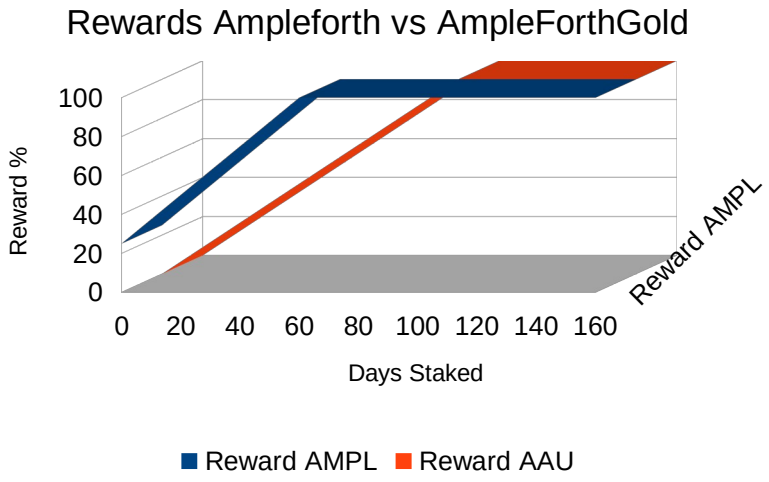
3. Midas Agents

A Midas Agent can be considered the ‘same as’ an Ampleforth Geyser. Each Midas agent contains a pool of unlocked AAU tokens that can be given as a reward when the staked tokens are unstaked. Multiple Midas Agents allow the user to stake different uniswap-v2 staking tokens. The Midas Agents that shall be supported are:

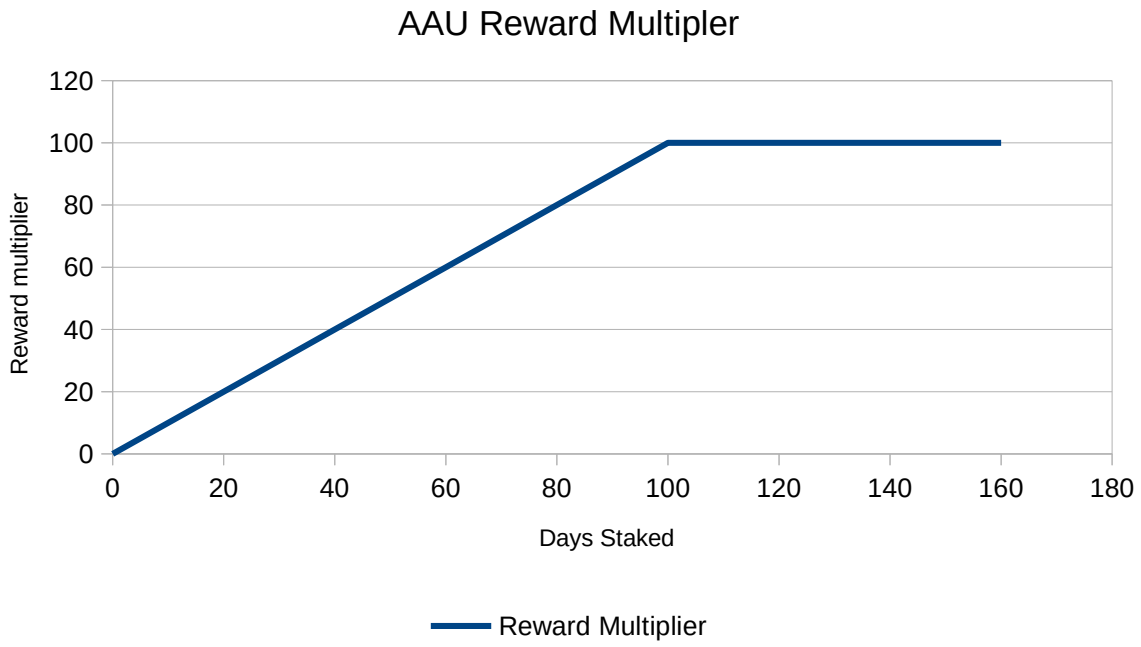
Staking Token	Percentage Distributor Share	Release Date
AAU	1%	6th October 2020
AAU-ETH-v2	8%	15th October 2020
PAXG-AAU-v2	42%	19th October 2020
AAU-PMGT-v2	41%	23th October 2020
AAU-AMPL-v2	8%	27th October 2020

4. Staking Rewards

The staking rewards algorithm used by AAU is identical to the original AMPL design. However, we have changed some of the input parameters to better suit our requirements. The chart below is a comparison of AMPL and AAU rewards over time. The AAU configuration gives less reward initially and takes longer to achieve a maximum reward.



This configuration change also affects the reward multiplier. The AAU reward multiplier goes from 1x to 100x over 100 days as can be seen in the graphical representation of the AAU reward multiplier below:



4.1 APY Calculations

The APY calculation can only ever be an approximation. Many of the inputs to the calculation change whenever anyone stakes or unstakes tokens. The ongoing price changes of AAU, ETH and gold also affect the calculation, as do many other factors. Therefore the APY should only be used as a guide only.

The APY calculation over 100 days is as follows:

```
APY   = (ARM).(FSP).(EVR)/(VUS)
```

Where

```
ARM   = Average Reward Multiplier for the 100 days
      = (50)
FSP   = user Fraction of Staked Pool
      = (user stake)/(sum of all users stakes)
VUS   = Value of the User Stake.
EVR   = Estimated Value of the Reward
```

5. Contract locations

Name	Contract Location
Midas Distributor	0xaea0a086ce5584cdffce2930497b38c937cbb24e
Midas Agent (AAU)	0x184B9614C46db115815fac4707B36347B98acfb3
Midas Agent (AAU-ETH-v2)	0x02Fc1453473a1FcCc2ac2D5f50aE5a933AFEc26e
Midas Agent (PAXG-AAU-v2)	TBD
Midas Agent (AAU-PMGT-v2)	TBD
Midas Agent (AAU-AMPL-v2)	TBD

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