Flopper - Detailed Documentation

The Maker Protocol's Debt Auction House * Contract Name: * flop.sol * Type/Category: * DSS —> System Stabilizer Module * Associated MCD System Diagram * Contract Source * Etherscan *

1. Introduction (Summary)

Summary: Debt Auctions are used to recapitalize the system by auctioning off MKR for a fixed amount of DAI. In this process, bidders compete by offering to accept decreasing amounts of MKR for the DAI they will end up paying.

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1. Contract Details

Flopper (Glossary)

- flop
- : debt auction (covering debt by inflating MKR and selling for stablecoins)
- lot
- : quantity up for auction / gems for sale (MKR)
- guy
- : high bidder (address)
- gal
- : recipient of auction income / receives dai income (this is the Vow contract)
- ttl
- : bid lifetime (Max bid duration / single bid lifetime)
- beg
- : minimum bid decrease
- pad
- : Increase forlot
- size duringtick
- (default to 50%)
- tau
- : maximum auction duration
- end
- : when the auction will finish / max auction duration
- kick
- : start an auction / Put up a new MKRbid
- for auction
- dent
- : make a bid, decreasing the lot size (Submit a fixed DAIbid
- with decreasinglot
- size)
- deal
- : claim a winning bid / settles a completed auction
- vat
-
    - the Vat's address
- gem
-
    - MKR Token (address)
- kicks
-
    - Total auction count, used to track auctionid
- s
- live
-
    - Cage flag
- wards [usr: address]
- ,rely
- /deny
- /auth
-
    - Auth mechanisms
- Bid
-
    - State of a specific Auction {bid
- ,lot

- ,guy
- ,tic
- ,end
- }
- bid
-
    - Bid amount inDAI / DAI paid
- tic
-
    - Bid expiry
- tick
-
    - restarts an auction
-

Parameters Set By Governance

- The Maker Governance voters determine the debt limit. The Debt auction is triggered when the system has DAI debt above that limit.
- Maker Governance sets theVow.dump
- which determines the startinglot
- for an auction as well as thepad
- which determines how much thatlot
- can increase duringtick
- .
- The contracts that areauth
- 'ed to callkick()
- (should only beVow
-) andfile()
- to changebeg
- ,ttl
- ,tau
- (should only be governance contracts).
-

Informational Note: Thecage sets the Flop to not be live anymore and theyank is used during Global Settlement in order to return a bid to the bidder since thedent anddeal can no longer be called.

1. Key Mechanisms & Concepts

The Flop Auction process begins with Maker Governance voters determining the system debt limit (Vow.sump). Debt Auctions are then triggered when the system has Dai debt that has passed that specified debt limit.

In order to determine whether the system has net debt, the surplus, accrued stability fees, and debt must be reconciled. Any user can do this by sending theheal transaction to the system contract namedVow.sol . Provided there is sufficient debt (i.e. debt after healing >Vow.sump), any user can send aVow.flop transaction to trigger a debt auction.

TheFlop is a reverse auction, where keepers bid on how little MKR they are willing to accept for the fixed Dai amount they have to pay at auction settlement. The bidders will basically compete with decreasinglot amounts of MKR for a fixedbid amount of Dai. Oncekick ed, thebid is set to the flop auction bid size (Vow.sump) andlot is set to a sufficiently large number (Vow.dump). The auction will end when the latest bid duration (ttl) has passedOR when the auction duration (tau) has been reached. The payback process begins when the first bid is placed. The first bid will pay back the system debt and each subsequent bid will pay back the previous (no longer winning) bidder. When the auction is over, the process ends by cleaning up the bid and minting MKR for the winning bidder.

If the auction expires without receiving any bids, anyone can restart the auction by callingtick(uint auction_id) . This will do two things:

1. It resetsbids[id].end
2. tonow + tau
3. It resetsbids[id].lot
4. tobids[id].lot * pad / ONE
5.

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Bidding Requirements during an auction

During an auction,lot amounts will decrease by a percentage with each newdent decreasing thelot by thebeg for the samebid of Dai. For example, thebeg could be set to 5%, meaning if the current bidder has alot of 10 (MKR) for abid of 100 (Dai),

then the next bid must pass at most alot of 9.5 (MKR) for abid of 100 (Dai).

Placing Bids

When a bid is beaten out by another bidder, the new winner's internal DAI balance is used to refund the previous winning bidder. Once placed, bidscannot be canceled.

Examplebidding flow:

1. Vowkick
2. s a new Flop Auction.
3. Bidder 1 makes a bid that decreases thelot
4. size bybeg
5. from the initial amount. Bidder 1's DAI balance in the Vat is decreased bybid
6. and the Vow's DAI balance in the Vat is increased bybid
7. .
8. Bidder 2 makes a bid that decreases Bidder 1'slot
9. bybeg
10. . Bidder 2's DAI balance in the Vat is decreased bybid
11. and Bidder 1's DAI balance in the Vat is increased bybid
12. (thereby refunding Bidder 1 for their now-losing bid).
13. Bidder 1 makes a bid that decreases Bidder 2'slot
14. bybeg
15. . Bidder 1's DAI =Vat.dai[bidder1]
16. -bid
17. ; Bidder 2's DAI =Vat.dai[bidder2]
18. +bid
19. .
20. Bidder 2 (and all the other bidders within the auction) decide it is no longer worth it to continue to accept lowerlot
21. s, so they stop bidding. Once theBid.tic
22. expires, Bidder 1 callsdeal
23. and new MKR tokens are minted to their address (MKR token contract.balances(Bidder1)
24. =MKR.balances(Bidder1)
25. +lot
26.).
27.

Note: During a Flop auction, thebeg is actually the minimum decrease amount. Indent the new bid has to have alot *beg that is less than or equal to the currentlot size. Since the theory of the Flop auction is that a bidder’s offer is to take fewer and fewer MKR tokens (lot) for the same amount of dai (bid) then thebeg is the amount each bid's offer should decrease by.

1. Gotchas (Potential Source of User Error)

Keepers

In the context of running a keeper (more infohere) to perform bids within an auction, a primary failure mode would occur when a keeper specifies an unprofitable price for MKR.

- This failure mode is due to the fact that there is nothing the system can do stop a user from paying significantly more than the fair market value for the token in an auction (this goes for all auction types,flip
- ,flop
- , andflap
-).
- This means, in the case of Flop, that since the Dai amount is fixed for the entire auction, the risk to the keeper is that they would make a "winning" bid that pays the bid amount in Dai but does not receive any MKR (lot
- == 0). Subsequent executions of this bad strategy would be limited by the amount of Dai (not MKR) in their vat balance.
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1. Failure Modes (Bounds on Operating Conditions & External Risk Factors)

2. Flopper

3. has the potential to issue an excessively huge amount of MKR and despite the mitigation efforts (the addition of thedump
4. andpad
5. parameters), ifdump
6. is not set correctly by governance, the huge issuance of MKR could still occur.
7. SeeSystem Stabilizer Module Documentation

8. .
9.

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