

DogCatcher

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dog.catcher is the first Catcher-type token on the Ethereum network, designed to accumulate and liquidate a bundle of targeted tokens ("DogCoins"). He is here to allow the crypto community to rectify the ill-advised fervor of 2021. dog.catcher tokens represent a bet against memecoins, using a modular architecture to inflict maximal pain in an adaptable way.



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1 Background

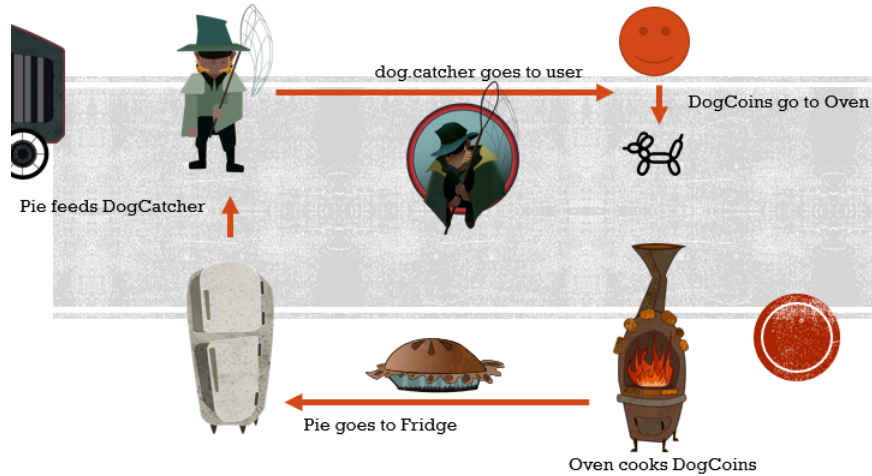
The 2021 crypto bull-run saw a proliferation of low-effort dog-themed meme tokens, with copy-pasted contracts enacting tax-on-transfer and deflationary tokenomics. The successes of DOGE and SHIB led to a temporary fervor. The pump-and-dumps followed by failure to innovate have left disillusioned communities of bagholders. The town is full of stray dogs.

Now, dozens of projects trundle on with broken promises, dashed dreams, and massive paper losses. DogCatcher is here with an eye on their liquidity pools. DogCatcher offers an attractive swap for the bagholders, and a completely novel mechanism for condensing value from multiple pools.

2 Contract Architecture

The main DogCatcher contract is a stable, unchanging and functional ERC-20. This will be referred to by its ticker symbol dog.catcher. The Oven and Fridge contracts represent modular "strategies" which can be swapped and adapted to different platforms and market conditions. DogCatcher aims to socialize the exit from the DogCoins to achieve higher levels of optimality at different steps. ETH gained from liquidating DogCoins is used to add LP which is owned by the protocol.

DogCatcher uses over-the-counter mint trades to efficiently drain value from target tokens, while bolstering the dog.catcher token with protocol-owned liquidity.



2.1 DogCatcher

The DogCatcher contract is based on the standard ERC-20 OpenZeppelin implementation. The token supply of the dog.catcher token starts at 0 and increases via 3 different methods: Presale, InstaMint, and VestMint.

After activation, DogCatcher maintains a list of target tokens. Each target token has an associated Oven. Holders of target tokens can mint dog.catcher by calling InstaMint or VestMint, which transfer the user's tokens to the appropriate oven and provide an ETH valuation back to DogCatcher.

The associated ETH value is then put in terms of dog.catcher by querying the Fridge. Therefore an important function of the modular contracts is to act as price oracle for different tokens, and for dog.catcher itself.

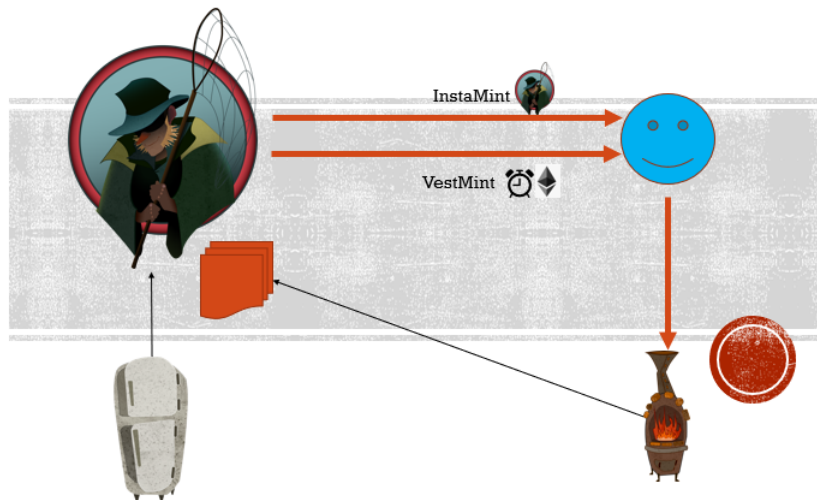
Once the dog.catcher tokens are minted, holders are encouraged to participate in the evolution of DogCatcher via Voting.

2.1.1 InstaMint

InstaMint is an instantaneous over-the-counter trade. The user's DogCoins are transferred to the oven, and a corresponding amount of DC is minted. This amount is based on the liquidity conditions of the DogCoin so as not to create an arbitrage opportunity.

Intuitively, InstaMint should be roughly competitive with what the user could get by taking the price impact of selling their token on the open market.

DogCatcher mints new tokens by transferring target tokens to the oven.



2.1.2 VestMint

VestMint offers the user a valuation closer to the full "paper value" of their DogCoins based on the current spot price.

The VestMint action has an associated ETH value and timestamp for some point in the future. Note that these values are supplied by the Oven contract.

When the period has ended, the CompleteVest function issues an equivalent amount of DC. Regardless of price fluctuations in DogCoins or DC, the user is minted an amount of DC equal to the ETH value saved at the time of their VestMint.

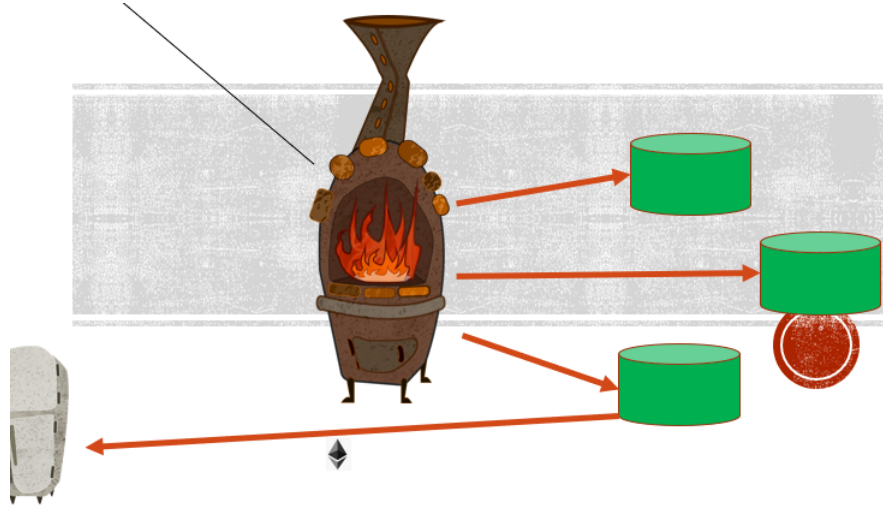
2.2 Oven

The oven's jobs are to:

- Provide accurate valuation of DogCoins for the DogCatcher contract's InstaMint and VestMint Functions.
- Provide the vesting time for a given number of DogCoins (generally to be based on the current balance or "backlog" of coins to be sold).
- Extract maximal value by liquidating DogCoin balances.
- Pass along WETH to the fridge in a trustless way.

By socializing the sells, the oven can enact a patient and optimal strategy that DogCoin holders (small and large) may find non-viable or tedious. See more in the Financial Strategy section.

The green liquidity pools are full of toxic sludge.



2.2.1 Oven 1.0

Our first oven implementation is set up to interface with WETH pairs on Uniswap V2. The cook function serves as a wrapper/stand-in for `swapExactTokensForTokens` from the UniswapV2 router. The caller is able to set the order size and deadline, but other degrees of freedom are removed. (Most importantly, the output of the swap can't be directed anywhere other than the fridge). For basic sandwich attacks, each mint requires the user to use a previously-stored exchange rate and also store a new one.

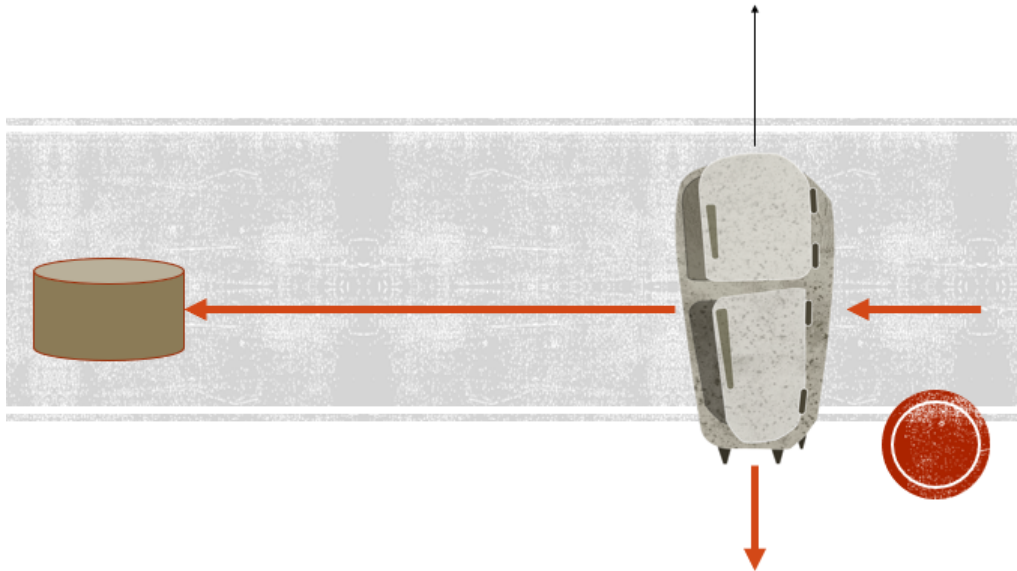
2.3 Fridge

The job of the fridge is simple: Use incoming WETH to reinforce the financial state of the `dog.catcher` token.

This is a fairly open-ended goal with many creative ways it could be done. Initially during growth phases DogCatcher will focus on the simple goal of maintaining a healthy ratio of LP to market cap. Here are some example actions:

- Buy `dog.catcher` on market
- Burn / remove from supply
- Add LP

The Fridge is also where the DogCatcher owners recover operational costs at some predetermined and transparent safe rate.



2.3.1 Fridge 1.0

Our first Fridge contract's main functions are designed to

- Spend half of ETH on buying dog.catcher in the open market.
- Use the other half to pair off and add LP which is owned by the Fridge.

The snack function spends WETH on DC, interacting directly with the WETH-DC uniswap pool. The exposed parameters are

- Order size
- Minimum amount out (slippage tolerance)
- Deadline

The preserve function adds WETH-DC LP.

Finally the raid function allows the developers to withdraw 1% of LP every 30 days. This amount is based on gas cost estimates of performing the operational transactions of the Fridge and Oven contracts.

2.4 Centralized Risk

The Oven and Fridge contracts are implemented carefully to minimize exposure to the contract creators/owners by removing degrees of freedom during

value-transferring actions. Once DogCoins enter the oven there is no way for a privileged individual to redirect or drain the value. It is hard-coded to go straight to the fridge. Similarly, the fridge has well-defined paths for value to flow into buybacks and LP.

If flaws are found in these strategies, the offending contracts can be orphaned, and DogCatcher reduces to a regular ERC-20. Therefore even introduction of compromised Oven and Fridge contracts can be quickly detected and mitigated by an alert community with minimal side effects to the protocol-owned liquidity.

Events are emitted whenever any of the pointers are updated. Even in the worst-case event of hostile owners, backdoored contracts can be identified and simply avoided.

2.4.1 Owners

Owner privilege includes setting targets, adding Oven and Fridge contracts to the ecosystem, and setting the operational dev addresses. This privilege is in the hands of a 2-of-2 multisig.

2.4.2 Operators

Since our first Oven and Fridge implementations are semi-autonomous, operator roles are defined with more limited abilities, which includes the swap and LP steps. Only 1 operator is required to execute a transaction, but the scope of damage by a compromised operator is limited as described above.

3 Financial Strategy

The DogCatcher architecture is intended to remove degrees of freedom that would cause market inefficiencies during transfers of value, by pooling tokens and executing a dispassionate strategy with certain key aspects.

3.1 Sizing

Placing a very small swap means that gas fees will represent a large percent. Placing a very large swap (relative to available liquidity) means that price impact becomes an issue.

For V2-style pools there is a precise way to retrieve as much value as possible from a given trade. For example, when liquidating a token (with pool reserves x) to ETH (with pool reserves y), and with transaction cost given by "gas" in units of ETH, the quantity to maximize is

$$\frac{\text{value realized}}{\text{paper value}} = \frac{\text{out} - \text{gas}}{\text{in} \times \frac{x}{y}}$$

For a given trade, the pool reserves x and y are constrained by the invariant

$$(x + \text{in})(y - \text{out}) = xy.$$

It's a routine check to see that the ratio above is maximized when

$$\text{in} = \frac{\sqrt{\text{gas}} \times x}{\sqrt{x} + \sqrt{\text{gas}}}.$$

3.2 Timing

If the DogCoin price was expected to go directly to zero, then optimal sizing considerations would no longer apply and we'd be best off liquidating everything all at once. However, we are betting on hardcore hordes of mouth-breathing moonboys and dip-buyers to help replenish the liquidity pool.

At a first approximation the strategy is to sell an optimally sized chunk every day until the balance is liquidated.

However, the appearance of poorly sized orders in the liquidity pool present an opportunity to take advantage of inefficiency. By responding to large buys with large sells, we can liquidate DogCoins quicker without sacrificing the realized price.

4 Evolution

DogCatcher has the potential to adapt and evolve over time and in response to market conditions.

4.1 Presale

Starting on 4/29/2022, dog.catcher can be minted at a rate of 1 million DC per ETH by calling the presaleMint() function on the contract. There is no lower or upper limit to consider the presale successful. The more funds raised, the larger LP and market cap DogCatcher starts with. Minted DC stays locked as a vote for the first DogCoin to target. When the activation happens, minted DC can be transferred.

4.2 Activation

The presale phase will end on 5/31/2022 (subject to change at the owner's discretion) and the DogCatcher contract will be activated.

Whatever has been minted to presale buyers will be doubled in a new mint. 80% of that amount will be paired with the raised ETH (minus deployment costs) for the initial LP seed. That LP will be transferred to the fridge.

That leaves 10% of the initial supply outstanding. Our wonderful artist and web developer have agreed to be paid from this stake. Any excess DC supply (depending on the success of the pre-sale, at most 5% of the initial supply) will be put into a discretionary pool for promotion and marketing opportunities.

In the interest of full transparency, note that the activation step entails some exposure to the contract owners. We expect the presale participation to be largely by personal invite from the developers, to those with an established

trust relationship who are familiar with our vision. Once we complete the manual step of sending the initial LP to the Fridge contract, then the price becomes free-floating at the same time that the centralized risk is reduced as described in subsection 2.4.

4.3 Campaigns

The first targeted token will be chosen by presale votes. Then the fun will begin!

After identifying target candidates, voting periods will go on for fixed period of time. During that time we will engage with the DogCatcher community to investigate the tokens in question, find their sore points, and begin outreach.

We see a potential to get people “on the bandwagon” to create a social movement and a fun ongoing blockchain drama.

4.4 Upgrade Roadmap

A number of technical upgrades and developments are possible, and will be prioritized based on market conditions and user engagement.

4.4.1 Voting



Originally a voting mechanism was built into DogCatcher as a rudimentary form of staking. We decided this would be more appropriate as a separate contract to allow more flexibility. Additionally, the use of Snapshot for polls might save holders money on gas fees. dog.catcher holders will be able to select a vote that reflects their opinion on matters (to be circulated on the website and socials), including but not limited to the next campaign target.

4.4.2 Variety

Our first Oven and Fridge iterations are confined to Uniswap V2 pools. An expanded contract will evaluate and optimize across other sources of liquidity, like SushiSwap and ShibaSwap.

4.4.3 Autonomy

A high priority for future Oven and Fridge modules will be to support DeX pools with built-in price oracles (like Uniswap V3). This will allow the contracts to be fully autonomous with lower gas usage.

4.4.4 ERC-1155 Ecosystem

We already have a proof-of-concept Oven contract that implements ERC-1155, allowing 1-for-1 minting of "reward tokens" corresponding to burnt Dogcoins. These could be used as valueless leaderboard token, NFT recipes, tipping, or tokens for web games. With significant community engagement or development budget from the presale we will revisit some of these potentials.