

Ethex Maker Reward

Dan Walton, Daniel Ellman, Adam Conger

ethex.market

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1 Introduction

Ethex is a transparent on-chain smart contract based trading system for tokens on the Ethereum network.

In order to further decentralize the protocol, we have designed a new token: the Ethex Maker Reward (EMR). The goal of this project is to drive liquidity, reward traders and further decentralize the Ethereum network.

Previous Work

There are a number of tokens on the Ethereum network that aim to improve and incentivize trade.

Holders of the Binance Coin are allowed to reduce their fees on the centralized Binance trading system.

ZRX project develops smart contracts and technology to facilitate decentralized trade. ZRX tokens can be used to pay fees; however, many decentralized systems have not required this functionality. At the moment, the ZRX token is auxiliary to the trading technology and smart contracts.

IDEX rewards traders with AURA tokens. AURA can be staked by nodes on the IDEX protocol (known as Snowglobe). This proof of stake network will enable decentralization of features that are currently supported by servers (i.e. trade history, transaction verification and more). Nodes are rewarded and incentivized for participating.

Motivation

Many trading systems employ a maker/taker approach. In the case of the Ethex Smart Contract, Makers provide liquidity by putting funds and offers onto the blockchain. Takers ‘take’ these offers by sending the other end of the offer. Markets like these traditionally employ or incentivize ‘Market Makers’ to ensure that there is liquidity for the trading system. The EMR token defines intrinsic, protocol level incentives for market makers that reward them for driving liquidity.

Ethex Milestones

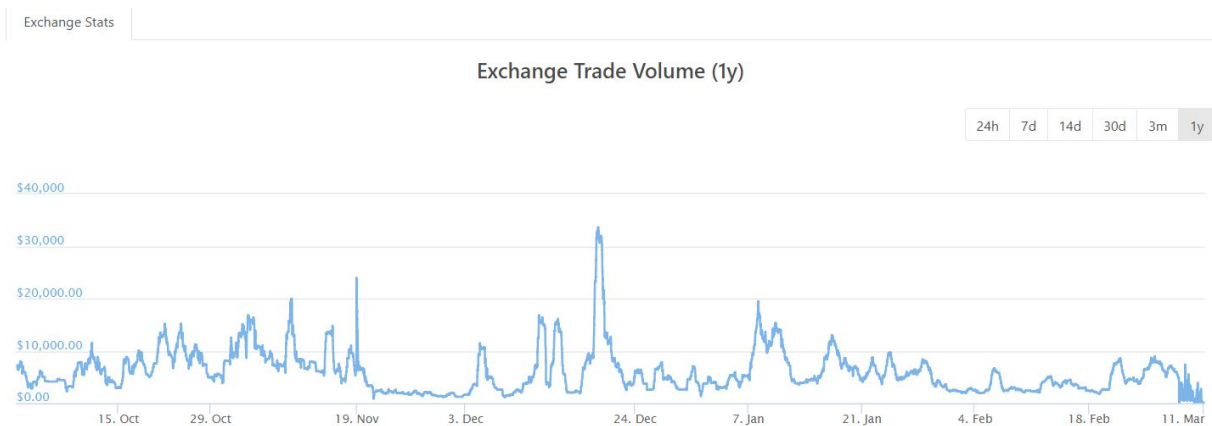
June 2018: Ethex 1.0 launched on Ethereum mainnet. Ethex Smart Contract [can be found here](#).

November 20, 2018: Ethex Trade Wallet released on [iOS](#) and [Android](#).

December 19, 2018: Highest Single Day, 24-hour Trade Volume (\$33,680). Historical trade volume stats [can be found here](#).

March 1, 2019: Beta Market Makers stop activities in anticipation of Ethex 2.0 launch.

To Be Determined: Ethex 2.0 with Ethex Maker Rewards (EMR) token launches on Ethereum mainnet.



2 EMR Token

Mining and Reward

A fixed reward of EMR tokens is periodically generated by a smart contract. EMR is rewarded to the order maker that provided the most trade volume on completed trades. This happens once per challenge period. If no orders are taken during the challenge period, rewards roll over into the next challenge period. Each challenge period will last about four hours.

Order takers, on the other hand, must pay a 0.2% fee (in ETH) to a smart contract in order to trade. These fees accumulate over a Fee Period of about 3 months. At the end of this period, EMR token holders can collect ETH fees proportional to their EMR token holdings. After each Fee Period, the fixed reward of EMR token reward is reduced by 15%.

This reward structure is designed to incentivize traders to make a large volume of competitive orders frequently. The winning Maker of each Challenge Period is determined by the highest amount of combined Taker volume across all markets on Ethex. Whenever a Taker accepts a Maker's trade, the Maker becomes known as a Challenger. A Challenger earns a "credit" in the challenge at the time the order is taken, regardless of when the order was made.

This reward structure incentivizes reasonable, completed orders on Ethex.

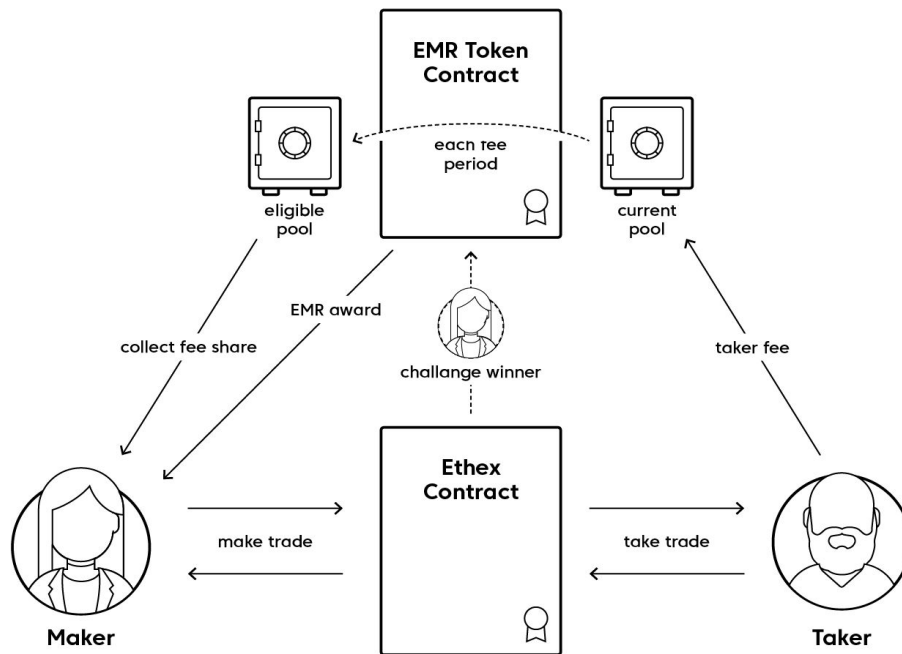


Figure 1: EMR Flow of Funds.

Unfilled Orders

In cases where a Maker makes a large offer, but no one accepts as a Taker within a given Challenge Period, the Maker will not earn EMR at that time. Instead, the Maker will have a chance to continue to compete for EMR in subsequent Challenge Period(s) until the market order is completely filled.

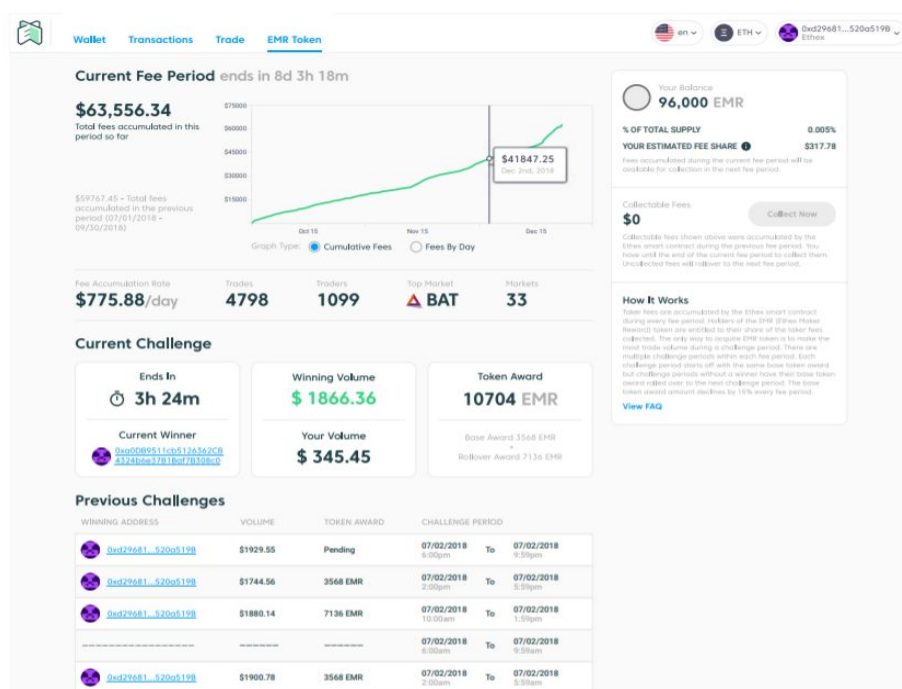
Partially Filled Orders

The timing of any Maker (Challenger) entry is ultimately determined by when a Taker accepts the market order. In cases where a market order is partially filled, only the amount filled (measured in ETH volume) will qualify as an entry in a Challenge Period. Any remaining,

unfilled portion of an order will rollover to subsequent Challenge Period(s). The remaining ETH remains eligible to be filled by a Taker and be considered as a Challenger's entry to compete for EMR.

Wash Trading

Out-of-market or wash trades are discouraged as in-market trades are the most efficient way to earn the EMR token. Parties wishing to wash trade will incur the taker fee with each transaction and receive no guarantee of winning the challenge. Traders that are making fair value swaps will only pay a bit of gas and have a chance at winning.



EMR User Interface (Beta), Complete UI explainer doc [can be found here](#).

ETH Fee Collection for EMR Token Holders

Collect on EtheX

Once per quarter, EMR token holders can Collect ETH fees by going to EtheX. When an EMR token holder collects ETH fees during each Fee Period on EtheX, EMR isn't exchanged. The EMR token holder retains all EMR funds in addition to collecting ETH fees.

Collect on Transfer

If an EMR token holder transfers EMR to another person or ERC20 wallet, this will automatically trigger the Collect function. Any pooled ETH fees that were uncollected prior to the transfer will be automatically sent out. This amount is based on how much EMR each person or wallet holds before the transfer. In subsequent Fee Period(s), the portion of pooled ETH fees that each is eligible to collect will change to reflect the amount of EMR each wallet holds post-transfer.

Uncollected Fees

It's essential that any EMR token holder Collect on EtheX or Collect on Transfer in order to receive pooled ETH. If an EMR token holder does not Collect their share of pooled ETH during a Fee Period, the potential ETH reward is lost and goes back into the eligible fee pool for the next Fee Period.

EMR Economic Properties

The EMR token has several interesting economic properties that set it apart from the majority of ERC20 tokens and cryptocurrency exchange tokens.

Algorithmically Generated (mined)

EMR tokens are not pre-mined or sold as part of an ICO. They are algorithmic incentives built into the trading protocol itself and are generated as participants bring value to the network.

Inherently Valuable

Unlike other tokens, EMR value is not controlled by any deflationary strategies like token burns or inflationary strategies like arbitrary issuance of new tokens. Because EMR tokens are backed by accumulating fees, they have a minimum value in ETH. This value should become less

volatile as time moves closer to the end of a Fee Period. EMR tokens can be used to collect fees in all subsequent Fee Periods.

Predictable Supply

A model of how EMR issuance and projected value might look over time [can be found here](#). It's important to note that figures in this model assume a 40% quarterly growth rate and will change based on real-world trade volume and market making.

Fungible and Transferrable

EMR tokens can be transferred just like any ERC20 token. Upon transfer, any fees are automatically collected for both sender and receiver. This makes all EMR tokens identical and fungible upon transfer. EMR is compatible with any ERC20 wallet. Additionally, users can connect to Ethex directly with MetaMask, Ledger or Ethex wallets to view EMR balances and withdraw their share of pooled ETH fees.

EMR vs. BTC Mining Comparison

In many ways, the mining (issuance) of EMR is more comparable to Bitcoin (BTC) than other ERC20 tokens or cryptocurrency exchange tokens. First, like BTC, EMR tokens are issued at a fixed rate and at predictable intervals. Second, the size of each EMR reward decreases over time. This is a similar concept to the halving of Bitcoin block rewards for miners.

Finally, like BTC, EMR issuance is determined by the protocol at launch. There's no way for Ethex to issue an additional supply of EMR tokens manually at any point in the future. Ethex does not have admin privilege to the smart contract that control EMR issuance; therefore, it's impossible to change the rules of EMR issuance through a backdoor.

There is one major difference between BTC mining and EMR mining. BTC mining is based on Proof-of-Work and requires miners to solve more complex algorithmic puzzles as difficulty increases. For BTC, this means earning mining rewards becomes more difficult over time and requires greater computing power via ASICs. In contrast, EMR mining is based on human-based activity (trading on Ethex).

As a result, the difficulty of mining EMR and collecting pooled ETH fees can vary greatly depending on the amount of ETH necessary to become the highest volume Maker (Challenger) on Ethex. For low-volume traders, it can be more difficult to mine EMR. However, it is possible that traders could form maker pools (akin to mining pools) in order to compete with high-volume market makers on Ethex.

Trading Pairs, Listings, Smart Contracts

Trading Pairs on Ethex

Ethex may add a market for EMR in the future, but EMR will not be used as a trading pair for token markets listed on the Ethex protocol. All ERC20 tokens traded on Ethex will use ETH as one half of trading pairs.

EMR Listings and Integrations By Third Parties

Third-parties have the ability to independently list EMR on exchanges as well as integrate EMR into Smart Contracts or dApps.

Smart Contracts

Smart Contracts that hold EMR tokens are not allowed to collect a fee share. This is because contracts are not automatically able to receive/hold ether and may inadvertently lose/lock ETH that is sent to them or otherwise cause an error. Any uncollected fees roll over into the next Fee Period.

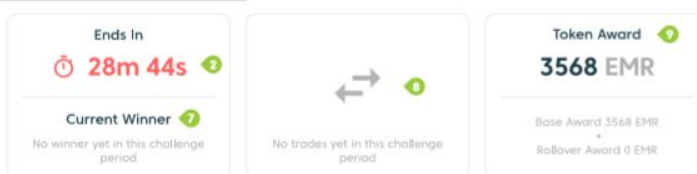
Current Challenge

1. **Timer.** Show how much time is left until the challenge period ends.
2. **Timer End.** Given that challenge periods are around four hours long, start off with hh:mm format. For the last hour, switch to mm:ss format and change color to red to create a sense of urgency.
3. **Current Winner.** Show the blockie, address and link out to etherscan on address click.
4. **Winning Volume.** Show the total trade volume generated by the current winner.
5. **Your Volume.** Show the total trade volume generated by the address viewing this dashboard
6. **Token Award.** Show the token award that the winning trade will receive; base + any rollover awards
7. **Current Winner Default State.** Card state when there hasn't been a winner yet.
8. **Volume Default State.** This is how the card would look when there haven't been any trades yet in the challenge.
9. **Token Award Default State.** This is how the card would look when the award for the challenge is just the base award - no rollovers.
10. **Current Winner = You.** This is how we would show the user that they are the current winner
11. **Volume When Winner = You.** When the user viewing this dashboard is the current winner - their volume = winning volume. Highlight both volume numbers in green when this happens.

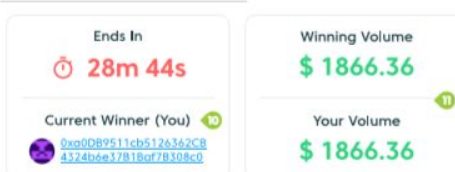
Current Challenge



Card Default State



When Winner = You



3 ESS Token

Ethex Supporter System (ESS)

50% of the fees paid by takers will go to holders of a second token known as ESS. These funds will be used to support the activities of Ethex Software Inc including dapp development, and ongoing support for the protocol. The other 50% go to holders of the EMR token.

4 Use Case Examples

Example 1 (Competing for EMR)

Alice is a brand new trader on Ethex. She makes a bid order to sell 1,000 exampleToken for 0.1 ETH each, 100 ETH total. A couple minutes later, Bob takes this entire order, paying 100.25 ETH. Alice receives 100 ETH. Bob receives 1,000 exampleToken. The fee of 0.25 ETH goes to the current fee pool. The top Volume is only 25 ETH prior to Alice and Bob's trade, so Alice becomes the current winner. A short time after the Challenge Period ends with no new challengers, she receives an EMR token award. Before EMR transfer completes, Alice's address automatically collects her share of the eligible pool (in this case, zero). She's now unable to Collect again — she has to wait until the current Fee Period ends before collecting her share.

Example 2 (Collecting Fees)

Alice holds 100 EMR, 10% of the total supply. At the end of the Fee Period, there is 400 ETH in pooled fees in the EMR smart contract. Once a new Fee Period starts, Trader Alice calls the Collect function, and receives 40 ETH from the EMR smart contract. Alice now owns 100 EMR and an additional 40 ETH.

Example 3 (Transferring EMR)

Trader Alice has 10 EMR (10% of total supply), and Trader Bob has 20 EMR (20% of total supply). In this case, Bob has yet to Collect pooled ETH on Ethex. When Bob sends 10 EMR to Alice, the Collect function is automatically called for both Alice and Bob. The result is the same as if Alice and/or Bob had decided to Collect on Ethex prior to the EMR transfer. Since the total amount of pooled fees (paid in ETH) that Alice and Bob Collect is proportional to the amount of EMR each has in their wallets prior to the transfer, Alice receives 10% of the ETH fee pool, while Bob receives 20%. After the transfer is complete, Alice has 20 EMR, and Bob has 10 EMR. If

Alice or Bob decide to transfer their EMR to other wallets in this initial Fee Period, the Collect function won't Collect pooled ETH fees within the same Fee Period.

At the end of the next Fee Period, Alice and Bob can Collect pooled ETH based on their new share of EMR. Assuming each maintains the same percentage of the total EMR supply, Alice will be able to Collect 20% of the ETH fee pool, while Bob can Collect 10%.

5 Protocol Specification

The following are technical, step-by-step rules of two smart contracts (Ethex Smart Contract and EMR Token Smart Contract). All terms referenced in the definition are the exact terms that can be found within the source code of the smart contracts.

Definitions

1. Challenge Period: A period of time in which Makers compete to earn (mine) an EMR token reward (once every 4 hours¹).
2. Fee Period: A period of time that determines when fees can be collected, and also when the EMR token reward size reduces. One fee period will last three months (2,192 hours¹, or 548 challenge periods).
3. Reduction Rate: a percentage by which the Award Amount is reduced every Fee Period (planned at 15%).
4. Award Amount: the amount of EMR tokens generated per award. The award amount starts at a set amount EMR (planned at 100), and is reduced by the Reduction Rate.
5. Volume: Measured in ETH, refers to the total size of completed trade(s).

Ethex Smart Contract

This contract collects fees, conducts challenges, determines winners.

1. Takers pay a fee when they fill an order. Paid in Ether, the fee is a percentage of Volume and is calculated at time of transaction by the Ethex smart contract. The fee is sent to the EMR token smart contract where it is pooled.
2. Each time an order is taken, a challenge occurs. The maker of this order is the "challenger":
 - a. Total Volume attributed to the challenger from a previous Challenge Period is set to zero.
 - b. The order Volume is added to the challenger's total Volume.
 - c. The challenger becomes "top trader" if she has the greatest total Volume ("top Volume").

3. When the contract runs any function, it checks challenge status. If any challenges occurred:
 - a. An “award pool” starts at 1 and is increased by the number of Challenge Periods that have elapsed since an award was last granted.
 - b. If a Challenge Period in which a challenge occurred has ended, the EMR token smart contract is told to grant the award pool to the top trader.

EMR Token Smart Contract

This contract creates and awards tokens; facilitates fee pooling and collections.

1. Only the Ethex smart contract can initiate award grants. Only the EMR token smart contract can create tokens.
2. When EMR tokens are awarded, the amount is equal to the current Award Amount multiplied by the award pool. Any new EMR tokens are generated at that time and transferred to the recipient address.
3. EMR token holders are entitled to a share of fees proportional to the number of tokens they own divided by the total supply of EMR tokens.
4. Once per Fee Period, at any time, an EMR token holder can “Collect” their share of the eligible fee pool.
5. At the beginning of each Fee Period, the eligible fee pool is set to the total balance of pooled fees. The Award Amount is reduced by the Reduction Rate.
6. Whenever EMR tokens are awarded, the winner first automatically collects their existing share (before any tokens are transferred). Similarly, whenever EMR tokens are transferred, both Sender and Receiver first automatically Collect their share (before any tokens are transferred). For clarity, one cannot Collect more than once in the same Fee Period.
7. The number of Fee Periods, k , will be as follows². Given P as our precision, B as our initial reward amount, and D as the percentage multiplier per Fee Period:

$$k = \left\lceil \frac{-P - \text{Log}(B) - \text{Log}(1-D)}{\text{Log}(D)} \right\rceil + 2$$

8. EMR tokens have 18 decimals.
9. EMR tokens will stop generating after k fee periods, for a zero-generation time of:

$$\text{ZeroGenTime} = \text{FeePeriod} * k$$

10. The total number of EMR tokens can be calculated as follows:

$$Total = B * (\frac{ChallengePeriod}{FeePeriod}) * \sum_{n=1}^k D^k$$

In the case where the base reward is 100 EMR, the percentage multiplier is .85, the challenge period is 4 hours, the fee period is 2192 hours (3 months), and the decimal precision is 18 digits, the values will be as follows:

k = 274.

ZeroGenTime = 600,608 hours (61.5 years).

Total Tokens Generated = 365,333.333333333267164708 EMR.

6 Summary

- Reward to highest volume trader encourages liquidity in the Ethereum network
- Minimum value in ETH thanks to accumulating fees.
- Owning EMR allows the collection of ETH from Smart Contracts.
- Completely decentralized; no admin address.

7 Appendix

Source Code:

Ethex is dedicated to transparency and honesty. The smart contracts and API for Ethex are fully open source. Source for the EMR token can be found here: <https://github.com/Ethex>

8 Footnotes

1. Time is actually based on ethereum block height, so these time values are somewhat approximate. New blocks appear approx every [14 seconds](#), give or take a few milliseconds.
2. Once the decrease in reward fails to change to the amount awarded due to rounding, EMR tokens will stop being rewarded. In other words, when the difference between the amount awarded between two fee periods is less than 0.000000000000000001 EMR, the amount awarded drops to zero.

So the difference between payments after k periods is given:

$$B \cdot D^{k-1} - B \cdot D^k$$

To find what k-value forces the difference in payments to drop below the desired precision, P, we can use the following:

$$B \cdot D^{k-1} - B \cdot D^k < P$$

Taking the logarithm of both sides and rearranging, we arrive at:

$$k - 1 > \frac{-P - \text{Log}(B) - \text{Log}(1-D)}{\text{Log}(D)}$$

A slight modification gives us the formula for k, in terms of the constants given.