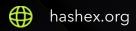


Onchain

smart contracts final audit report

May 2024





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1. Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the disclaimer below - please make sure to read it in full.

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2. Overview

HashEx was commissioned by the Onchain team to perform an audit of their smart contract. The audit was conducted between 06/05/2024 and 09/0/2024.

The purpose of this audit was to achieve the following:

- Identify potential security issues with smart contracts
- Formally check the logic behind given smart contracts.

Information in this report should be used for understanding the risk exposure of smart contracts, and as a guide to improving the security posture of smart contracts by remediating the issues that were identified.

The code is available in the Sepolia testnet at 0x32aA21f95D4dD93CB4398162032a021Bef08Be55.

Update. The Onchain team has responded to this report. The SHA-1 of the files are: 599fc0cf6724de9812b2a763c206d4228a3d6014 token.sol

aa56184851c204b1c5a31fdd686780e3218563f1 interfaces/lFactory.sol

cc07efb4d01a249e3360fe4cf27cd2f2aa02e497 interfaces/IRouter.sol

5d40bb46f54bd6d48a120faa37ddaf4f3c7654f9 libraries/SafeERC20.sol

2.1 Summary

Project name	Onchain
URL	https://onchaincoin.io/
Platform	Ethereum
Language	Solidity
Centralization level	• High
Centralization risk	• High

2.2 Contracts

Name	Address
OnchainToken	

3. Project centralization risks

The contract owner can update the whitelists of addresses that are exempt from transfer fees and limits. Initial fee value is 75/80% and initial transaction limit is 0.2%/2% (before and after the launch).

The owner can update transaction's fees, maximum amount and swap threshold within safety limits.

The owner can update list of trading pairs to apply transfer fees.

The owner can enable and disable the protection against MEV.

The owner can disable automatic mechanism of tax reducing and limit increasing, and then abstain from updating limits manually.

The owner can set treasury address, which receives swapped ETH, to a malicious one to impede or block transfers.

4. Found issues



Cfe. OnchainToken

ID	Severity	Title	Status
Cfelb8	Medium	Possible DoS by gas	
Cfelb9	Medium	Unsafe cast	
Cfelb7	Medium	Lack of tests and documentation	A Partially fixed
Cfelb5	Low	Lack of events	
Cfelb4	Low	Gas optimizations	Acknowledged
Cfelb6	Info	Swaps with 100% slippage	Acknowledged
Cfelc8	• Info	The transfer delay check does not work if anti MEV functionality is disabled	
Cfelc9	• Info	Account abstraction ERC4337 wallets not supported	A Partially fixed

5. Contracts

Cfe. OnchainToken

Overview

An ERC-20 standard token with transfer fees individual for buys and sells to/from owner-controlled list of DEX pairs). Collected fees are swapped to native EVM coins once a threshold is reached, which are transferred out to an address controlled by the token owner. The token includes limit for transaction amount and MEV protection based on the last block for each holder and transaction signer.

Issues

Cfelb8 Possible DoS by gas

The treasury address receives swapped ETH by **call()** method without specified gas amount. A malicious treasury can be used to perform gas spending actions or to significantly increase needed gas to complete token transfer.

```
function _transfer(
   address from,
   address to,
   uint256 amount
) internal virtual override {
   if (!exemptFromFees[from] && !exemptFromFees[to]) {
      require(tradingAllowed, "Trading not active");
      amount -= handleTax(from, to, amount);
      checkLimits(from, to, amount);
   }
   super._transfer(from, to, amount);
}

function handleTax(
```

```
address from,
address to,
uint256 amount
) internal returns (uint256) {
   if (balanceOf(address(this)) >= swapTokensAtAmt && !isPair[from]) {
      convertTaxes();
   }
   ...
}

function convertTaxes() private {
   ...
   if (ethBalance > 0) {
      (success, ) = treasury.call{value: ethBalance}("");
   }
}
```

Recommendation

Limit the amount of forwarded gas.

Cfelb9 Unsafe cast

MediumØ Resolved

The updateTransactionLimit() function include safety check to revert limit below 0.1% of total supply. However, unsafe cast uint256 to uint128 may result in bypassing this safety check and updating the txLimits.transactionLimit variable to unwanted value.

Recommendation

Use the SafeCast library from OpenZeppelin.

Cfelb7 Lack of tests and documentation

Medium

Partially fixed

The project doesn't contain any tests and documentation. We recommend increasing test coverage, providing the documentation section, and adding documentation using NatSpec Format.

This would help in development, as well as simplify user interaction with the contract (including using the block explorer).

In particular, we found unclear the use of tokensForTax variable. The only way it may concern the workflow is following: if all transfer taxes are below 1e9, the accumulated fees wouldn't be swapped even after exceeding the swapTokensAtAmt threshold.

Also, the anti-MEV and transfer delay functionality is not described which makes it impossible to check whether the implemented functionality protects from attacks.

Cfelb5 Lack of events



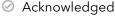


The functions updateSwapTokensAmt(), enableTrading(), updateMevBlockerEnabled(), removeTransferDelay() change important variable in the contract storage, but no event is emitted.

We recommend adding events to these functions to make it easier to track their changes offline.

Cfelb4 Gas optimizations





• Unnecessary reads from storage in the constructor: owner() variable.

 Unnecessary stored data: the router contract doesn't hold any tokens and may not be included in the exemptFromFees list.

- Multiple reads from storage in the swapTokensForETH() function: swapTokensAtAmt variable.
- Redundant code: if (contractBalance > 0) check should be omitted in the convertTaxes() function.
- Unnecessary reads from storage in the **updateTransactionLimit()** function: **txLimits.transactionLimit** variable.
- Unnecessary reads from storage in the setInternalTaxes() function: after phaseBlocks
 3600 the dynamicTaxOn switch should be disabled automatically.
- Redundant code: tokensForTreasury calculations in the handleTax() function:
 tokensForTreasury = ... tax * taxes.totalTax / taxes.totalTax

Cfelb6 Swaps with 100% slippage

■ Info
Ø Acknowledged

DEX swapping in the swapTokensForETH() function is called with 100% slippage. A large swapTokensAtAmt amount may result in successful MEV actions, if the MEV protection is disabled.

Cfelc8 The transfer delay check does not work if anti MEV functionality is disabled

Info

Resolved

The function **checkLimits()** performs the transfer delay and anti-MEV checks. One of the checks for the transfer delay is that the token holder's last transfer was in previous blocks. However, the token holder's last transfer block is updated only if the anti-MEV functionality is enabled.

```
);
                require(
                     tx.origin == to,
                     "no buying to external wallets yet"
                );
            }
        }
    if (antiMevEnabled) {
        if (isPair[to]) {
            require(
                _holderLastTransferBlock[from] < block.number,
                "Anti MEV"
            );
        } else {
            _holderLastTransferBlock[to] = block.number;
            _holderLastTransferBlock[tx.origin] = block.number;
        }
    }
}
```

Recommendation

Update the holder's last transfer block if the transfer delay if case.

Cfelc9 Account abstraction ERC4337 wallets not • Info • Partially fixed supported

The contract uses <code>tx.origin</code> for the anti-MEV and transfer delay checks. These checks may incorrectly block token transfers on Account abstraction wallets. With ERC4337 the <code>tx.origin</code> is not the token holder who sends the transaction but the bundler which breaks the logic of the checks. Moreover, if transfer delay is enabled, account abstraction wallets won't be able to receive any tokens.

Update

The transfer delay functionality was removed from the token. But antiMEV checks can still incorrectly block some token transfers from Account abstraction wallets. If there is a token transfer transaction sent by a relayer/bunder, the subsequent tokens sells sent from this relayer/bundler that go into the same block will fail.

6. Conclusion

3 medium, 2 low severity issues were found during the audit. 2 medium, 1 low issues were resolved in the update. The reviewed contracts are highly dependent on the owner's account. See the centralization risks chapter.

This audit includes recommendations on code improvement and the prevention of potential attacks.

Appendix A. Issues' severity classification

• **Critical.** Issues that may cause an unlimited loss of funds or entirely break the contract workflow. Malicious code (including malicious modification of libraries) is also treated as a critical severity issue. These issues must be fixed before deployments or fixed in already running projects as soon as possible.

- **High.** Issues that may lead to a limited loss of funds, break interaction with users, or other contracts under specific conditions. Also, issues in a smart contract, that allow a privileged account the ability to steal or block other users' funds.
- Medium. Issues that do not lead to a loss of funds directly, but break the contract logic.
 May lead to failures in contracts operation.
- **Low.** Issues that are of a non-optimal code character, for instance, gas optimization tips, unused variables, errors in messages.
- **Informational.** Issues that do not impact the contract operation. Usually, informational severity issues are related to code best practices, e.g. style guide.

Appendix B. Issue status description

- ❷ Resolved. The issue has been completely fixed.
- **Partially fixed.** Parts of the issue have been fixed but the issue is not completely resolved.
- Acknowledged. The team has been notified of the issue, no action has been taken.
- **Open.** The issue remains unresolved.

Appendix C. List of examined issue types

- Business logic overview
- Functionality checks
- Following best practices
- Access control and authorization
- Reentrancy attacks
- Front-run attacks
- DoS with (unexpected) revert
- DoS with block gas limit
- Transaction-ordering dependence
- ERC/BEP and other standards violation
- Unchecked math
- Implicit visibility levels
- Excessive gas usage
- Timestamp dependence
- Forcibly sending ether to a contract
- Weak sources of randomness
- Shadowing state variables
- Usage of deprecated code

Appendix D. Centralization risks classification

Centralization level

- **High.** The project owners can manipulate user's funds, lock user's funds on their will (reversible or irreversible), or maliciously update contracts parameters or bytecode.
- Medium. The project owners can modify contract's parameters to break some functions of the project contract or contracts, but user's funds remain withdrawable.
- Low. The contract is trustless or its governance functions are safe against a malicious owner.

Centralization risk

- High. Lost ownership over the project contract or contracts may result in user's losses.
 Contract's ownership belongs to EOA or EOAs, and their security model is unknown or out of scope.
- **Medium.** Contract's ownership is transferred to a contract with not industry-accepted parameters, or to a contract without an audit. Also includes EOA with a documented security model, which is out of scope.
- **Low.** Contract's ownership is transferred to a well-known or audited contract with industry-accepted parameters.

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