Cyberscope

Audit Report

Mythic Ore

January 2022

Network	BSC
Address	0x30d7f50085ae9790065cffac97104838199dc054
Audited by	© cyberscope

Table of Contents

Contract Review

Contract Name	MORE
Compiler Version	v0.8.17+commit.8df45f5f
Optimization	1024 runs
Explorer	https://bscscan.com/address/0x30d7f50085ae9790065cffac97104838199dc054
Address	0x30d7f50085ae9790065cffac97104838199dc054
Network	BSC
Symbol	MORE
Decimals	18
Total Supply	100,000,000
Domain	mythicore.io

Audit Updates

Initial Audit	24th November 2022
Corrected Phase 1	29th November 2022
Corrected Phase 2	30th November 2022
Corrected Phase 3	6th December 2022
Corrected Phase 4	07 Jan 2023

Source Files

Filename	SHA256
Interfaces/IAgent.sol	226341427338c7394fee5da055ddfa1bd35ceb4541f9bdf28fc63f622eba6786
Interfaces/IERC20.sol	8e4432d03fcab96a31b3325d04d921e505e435b8f1a3c771de4ec35a3af0c207
Interfaces/IUniswap.sol	791d1ec4ab5cc06068d70ee99e048b4100d3264b6b1d99d00baf82b94f3c5126
More.sol	7d4cbb333704544ab9fd68981c2578fc1b273c17d258c0d6d33e191c490bbd53

Contract Architecture

The contract implements an ERC20 token enriched with some features like reflections and autogenerated liquidity pool. The implementation of the contract is custom and it is not based on any well-known implementation. As a result, some concepts and methodologies like allowance, reflections, gas optimization, etc. could be more well-structured. The team is advised to fork a well-known ERC20 implementation that contains the same features and apply their requirements.

Team's Reply 29 November 2022

The team has acknowledged that this is not a security issue and states:

"We are not using Safemoon-fork reflections system cause:

1. *It is expensive in terms of gas too.*
2. *It is harder to implement considering we have a different method of share calculations.*
3. *So all gas optimizations are targeted mainly to compensate costly reflections system."*

Team's Update 14 December 2022

"7.5% locked for liquidity injection. Liquidity gathered from fees can be unlocked but we have a separate lock mechanism for that again in the contract."

Contract Analysis

● Critical ● Medium ● Minor / Informative

Severity	Code	Description	Status
●	TUU	Time Units Usage	Unresolved
●	ULTW	Transfers Liquidity to Team Wallet	Unresolved
●	DSO	Data Structure Optimization	Unresolved
●	RM	Reflection Mechanism	Acknowledged
●	RLS	Redundant Liquidity Swaps	Acknowledged
●	TSD	Total Supply Diversion	Acknowledged
●	L04	Conformance to Solidity Naming Conventions	Acknowledged
●	L13	Divide before Multiply Operation	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

TUU - Time Units Usage

Criticality	Minor / Informative
Status	Unresolved

Description

The contract is using arbitrary numbers to form time-related values. As a result, it decreases the readability of the codebase and prevents the compiler to optimize the source code.

```
require(duration < 86400 * 366 + 1, "LT0");
...
86400 * 366 + 1
...
```

Recommendation

It is a good practice to use the time units reserved keywords like `seconds`, `minutes`, `hours`, `days`, `weeks` and `years` to process time-related calculations.

It's important to note that these time units are simply a shorthand notation for representing time in seconds, and do not have any effect on the actual passage of time or the execution of the contract. The time units are simply a convenience for expressing time in a more human-readable form.

ULTW - Transfers Liquidity to Team Wallet

Criticality	Minor / Informative
Location	More.sol#L1191
Status	Unresolved

Description

Any user has the authority to transfer funds without limit to an external wallet. These funds have been accumulated from fees collected from the contract. The owner may take advantage of it by calling the `deliverBNBToAgent` method.

The `potsBNB` structure represents the amount of BNB that has been accumulated on the contract. These variables are reset even if not the entire amount that they represent have been issued. As a result, it produces inconsistency between the actual amount that the contract has accumulated and the variables that represent it.

```
function deliverBNBToAgent(uint256 agentPotToSend) external
{...}
```

Recommendation

The team is advised to carefully check

- The inconsistency that is produced between the actually accumulated funds and the variables that represent them.
- The public permission of `deliverBNBToAgent` method.
- The possibility of a reentrance attack in case the `Agent` address is compromised.

DSO - Data Structure Optimization

Criticality	Minor / Informative
Location	More.sol#L9
Status	Unresolved

Description

The contract implements a `ListAddress` data structure in order to keep a `set` of addresses. This data structure is based on the fact that the first item will always be the zero address. As a result, some side-effects may be produced:

- It may be wrongly assumed that the data structure is not empty, even then it is empty.
- It may be wrongly assumed that zero access has a privilege. For instance, it is a shareholder even if it does not have shared.
- Unesseccary gas is produced from the extra element that is stored.

```
function add(ListStruct storage self, address account) internal
{
    if (self.Array.length == 0)
    {
        self.Array.push(address(0));
    }
```

Recommendation

The team is advised to consider the current implementation of the `set` data structure. It could implement a more performant `set` data structure that is not based on the first zero-element assumption.

Additionally, it could also exploit third-party solutions like the Open Zeppelin `EnumerableSet`
https://github.com/OpenZeppelin/openzeppelin-contracts/blob/master/contracts/utils/structs/EnumerableSet.sol

RM - Reflection Mechanism

Criticality	Minor / Informative
Location	More.sol#L335,1028
Status	Acknowledged

Description

The contract uses a complicated technique to send the reflected tokens to each account. On every transfer, the sender's and the receiver's balance is updated according to the corresponding reflected amount. This process produces a large amount of gas cost proportionally to the number of transfers.

```
updateReflections(sender);
...
updateReflections(recipient);
```

Recommendation

The contract could use a simpler reflections mechanism that is based on a classic safemoon fork.

https://github.com/safemoonprotocol/Safemoon.sol/blob/main/Safemoon.sol

Team Update

The team has acknowledged that this is not a security issue.

The team response is mentioned in the **Contract Architecture** section.

RLS - Redundant Liquidity Swaps

Criticality	Minor / Informative
Location	More.sol#L1490,1508
Status	Acknowledged

Description

In order to accumulate tokenLiquidityReserves the contract swap tokens for BNB and then swap back the proportional BNB for tokens.

```
function addLiquidityFromTokenReserves() private
{...}

function refillLiquidityTokenReserves() private
{...}
```

Recommendation

The contract could accumulate the tokens directly from the liquidity fees.

Team Update

The team has acknowledged that this is not a security issue and states:

“Initially tokenLiquidityReserves is filled so no reduntant swaps then after some time it is true that redundant swap are gonna happen, but: it saves just a little bit of gas to not write to tokenLiquidityReserves on every taxed tx it is not useful to write every time to tokenLiquidityReserves as initially it is filled we were planning to fill it after deployment but it is surely more reasonable to do it here that way instead of using 50/50 system we forward 100% bnb from tax to liquidity and it works while tokenLiquidityReserves is filled not as a result of a swap.”

TSD - Total Supply Diversion

Criticality	Minor / Informative
Location	More.sol#L1349
Status	Acknowledged

Description

The total supply of a token is the total number of tokens that have been created, while the balances of individual accounts represent the number of tokens that an account owns. The total supply and the balances of individual accounts are two separate concepts that are managed by different variables in a smart contract. These two entities should be equal to each other.

In the contract, the amount that is added to the total supply does not equal the amount that is added to the balances. As a result, the sum of balances is diverse from the total supply.

```
_balanceOf[account] += _reflected;
```

Recommendation

The total supply and the balance variables are separate and independent from each other. The total supply represents the total number of tokens that have been created, while the balance mapping stores the number of tokens that each account owns. The sum of balances should always equal the total supply.

Team Update

The team has acknowledged that this is not a security issue and states:

“This amount is deducted from the total supply in notifyTaxSystem() then its continuously being added here until reflection cycle is finished while it is true that the sum of all balances won't be equal to the total supply in most cases in the end, they will become equal (minus some small amount as a result of rounding down on divisions) but sum of all balances will not ever be greater than total supply so your comment that "The amount that is added to the total supply does not equal the amount that is added to the balances" is not true because tokens here are not

actually being minted or added to the total supply but as stated in a comment above it is true that sum of all balances will be slightly lower than total supply presonally I do not think this is a major issue."

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	More.sol#L57,59,90,108,110,111,133,134,136,149,204,206,207,208
Status	Acknowledged

Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
uint256 private constant _decimals = 18
uint256 private constant _totalSupply = MAX_SUPPLY
mapping(address => ModifiersData) public Modifiers
mapping(address => uint256) private ReflectionsPerSharePaid
ListAddress.ListStruct private Shareholders
ListAddress.ListStruct private AuthorizedContracts
mapping(address => LockConfig) public LockConfigs
mapping(address => mapping(uint256 => LockInstance)) public Locks
mapping(uint256 => uint256) public MaxCompoundingIterations
mapping(uint256 => TaxData) private Taxes
IUniswapV2Router02 private SwapRouter
address public SwapAgent
address public MainAccount
IAgent public Agent
```

Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

Team Update

The team has acknowledged that this is not a security issue.

L13 - Divide before Multiply Operation

Criticality	Minor / Informative
Location	More.sol#L1221,1223,1225,1231,1234,1240,1258,1401,1402,1403,1404,1405,1432,1433,1434,1435,1436,1439
Status	Unresolved

Description

It is important to be aware of the order of operations when performing arithmetic calculations. This is especially important when working with large numbers, as the order of operations can affect the final result of the calculation. Performing divisions before multiplications may cause loss of prediction.

```
uint256 taxAmountScaled = taxAmount / TOKEN_POTS_DIVISOR
teamAmount = taxAmountScaled * taxData.team / totalTax
```

Recommendation

To avoid this issue, it is recommended to carefully consider the order of operations when performing arithmetic calculations in Solidity. It's generally a good idea to use parentheses to specify the order of operations. The basic rule is that the multiplications should be prior to the divisions.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	More.sol#L719,734
Status	Unresolved

Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
MainAccount = newAccount
SwapAgent = newSwapAgent
```

Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	More.sol#L3
Status	Unresolved

Description

The ^ symbol indicates that any version of Solidity that is compatible with the specified version (i.e., any version that is a higher minor or patch version) can be used to compile the contract. The version lock is a mechanism that allows the author to specify a minimum version of the Solidity compiler that must be used to compile the contract code. This is useful because it ensures that the contract will be compiled using a version of the compiler that is known to be compatible with the code.

```
pragma solidity ^0.8.17;
```

Recommendation

The team is advised to lock the pragma to ensure the stability of the codebase. The locked pragma version ensures that the contract will not be deployed with an unexpected version. An unexpected version may produce vulnerabilities and undiscovered bugs. The compiler should be configured to the lowest version that provides all the required functionality for the codebase. As a result, the project will be compiled in a well-tested LTS (Long Term Support) environment.

L20 - Succeeded Transfer Check

Criticality	Minor / Informative
Location	More.sol#L761
Status	Unresolved

Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
IERC20(tokenContract).transfer(msg.sender, balance)
```

Recommendation

The contract should check if the result of the transfer methods is successful. The team is advised to check the SafeERC20 library from the Openzeppelin library.

Contract Functions

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
IAgent	Interface			
	delegate	External	Payable	-
	marketplaceDelegate	External	Payable	-
	notifyTransferListener	External	✓	-
	notifyTransferListener	External	✓	-
	tryToLock	External	✓	-
	tryToLockExtra	External	✓	-
	tryToUnlock	External	✓	-
IERC20	Interface			
	name	External		-
	symbol	External		-
	decimals	External		-
	totalSupply	External		-
	balanceOf	External		-
	allowance	External		-
	approve	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
IUniswapV2Factory	Interface			
	feeTo	External		-
	feeToSetter	External		-
	getPair	External		-

	allPairs	External		-
	allPairsLength	External		-
	createPair	External	✓	-
	setFeeTo	External	✓	-
	setFeeToSetter	External	✓	-
IUniswapV2Pair	Interface			
	name	External		-
	symbol	External		-
	decimals	External		-
	totalSupply	External		-
	balanceOf	External		-
	allowance	External		-
	approve	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	DOMAIN_SEPARATOR	External		-
	PERMIT_TYPEHASH	External		-
	nonces	External		-
	permit	External	✓	-
	MINIMUM_LIQUIDITY	External		-
	factory	External		-
	token0	External		-
	token1	External		-
	getReserves	External		-
	price0CumulativeLast	External		-
	price1CumulativeLast	External		-
	kLast	External		-
	swap	External	✓	-

	sync	External	✓	-
	initialize	External	✓	-
IUniswapV2Router01	Interface			
	factory	External		-
	WETH	External		-
	addLiquidity	External	✓	-
	addLiquidityETH	External	Payable	-
	removeLiquidity	External	✓	-
	removeLiquidityETH	External	✓	-
	removeLiquidityWithPermit	External	✓	-
	removeLiquidityETHWithPermit	External	✓	-
	swapExactTokensForTokens	External	✓	-
	swapTokensForExactTokens	External	✓	-
	swapExactETHForTokens	External	Payable	-
	swapTokensForExactETH	External	✓	-
	swapExactTokensForETH	External	✓	-
	swapETHForExactTokens	External	Payable	-
	quote	External		-
	getAmountOut	External		-
	getAmountIn	External		-
	getAmountsOut	External		-
	getAmountsIn	External		-
IUniswapV2Router02	Interface	IUniswapV2Router01		
	removeLiquidityETHSupportingFeeOnTransferTokens	External	✓	-
	removeLiquidityETHWithPermitSupportingFeeOnTransferTokens	External	✓	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-

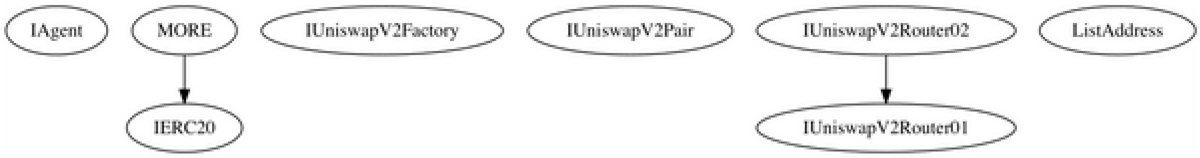
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
ListAddress	Library			
	add	Internal	✓	
	remove	Internal	✓	
MORE	Implementation	IERC20		
	_onlyMain	Private		
	_onlyAuthorized	Private		
	_onlySwap	Private		
	_flagCheck	Private		
		Public	✓	-
		External	Payable	-
	transferFrom	External	✓	-
	transfer	External	✓	-
	lightningTransfer	External	✓	onlyAuthorized
	prepareReferralSwap	External	✓	onlySwap
	approve	External	✓	-
	toggleLocks	External	✓	flagCheck
	lockTokens	External	✓	-
	lockExtraTokens	External	✓	-
	_beforeLock	Private	✓	
	unlockTokens	External	✓	-
	unlockTokensEarly	External	✓	-
	_beforeUnlock	Private	✓	
	tryToUnlock	External	✓	-
	setModifiers	External	✓	onlyAuthorized
	setModifiers	External	✓	onlyAuthorized

	addMultiplier	External	✓	onlyAuthorized
	setBuyTaxReduction	External	✓	onlyAuthorized
	setSellTaxReduction	External	✓	onlyAuthorized
	addTokensToLiquidityReservesFromContract	External	✓	onlyAuthorized
	addBNBToLiquidityPot	External	Payable	-
	buybackAndBurn	External	Payable	-
	buybackAndLockToLiquidity	External	Payable	-
	addAuthorized	External	✓	onlyMain
	removeAuthorized	External	✓	onlyMain
	lockLiquidityFromFees	External	✓	onlyMain
	withdrawLiquidityFromFees	External	✓	onlyMain
	toggleSellAddress	External	✓	onlyMain flagCheck
	toggleAccountTaxExclusion	External	✓	onlyMain
	toggleAccountMaxAccountRuleExclusion	External	✓	onlyMain flagCheck
	setReferralTaxReduction	External	✓	onlyMain
	setMaxAccountAndMaxMultiplier	External	✓	onlyMain
	setReflectionsDelayAndDistributingPart	External	✓	onlyMain
	setMaxCompoundingIterations	External	✓	onlyMain
	setMinGasForWork	External	✓	onlyMain
	setTax	External	✓	onlyMain
	setWorkAmounts	External	✓	onlyMain
	setMainAccount	External	✓	onlyMain
	setAgents	External	✓	onlyMain
	addToReflectionsFromContract	External	✓	onlyAuthorized
	withdrawFreeBNB	External	✓	onlyMain
	withdrawFreeTokens	External	✓	onlyMain
	launchToken	External	✓	onlyMain
	balanceOf	External		-

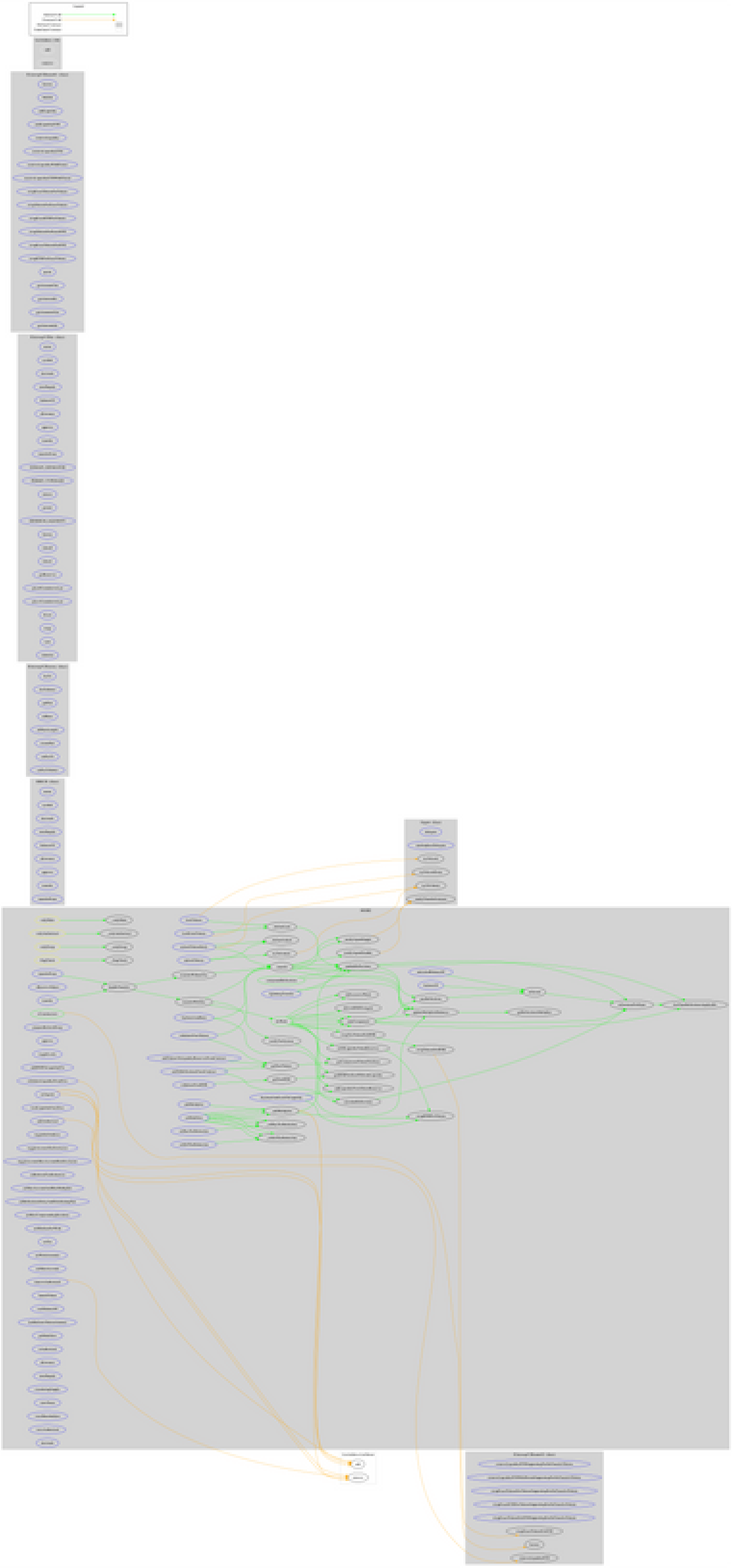
	unlockedBalanceOf	External		-
	rawBalanceOf	External		-
	lastReferrerTokensAmount	External		-
	getModifiers	External		-
	getModifiers	External		-
	isAuthorized	External		-
	allowance	External		-
	totalSupply	External		-
	circulatingSupply	External		-
	viewTaxes	External		-
	viewShareholders	External		-
	viewAuthorized	External		-
	decimals	External		-
	doWork	Public	✓	-
	doExcessiveWork	Private		
	autoCompound	Public	✓	-
	compoundReflections	Public	✓	-
	reflected	Public		-
	reflected	Private		
	getFreeTokens	Public		-
	getFreeBNB	Public		-
	_transfer	Internal	✓	
	notifyAgentSingle	External	✓	-
	notifyAgentDouble	External	✓	-
	handleTransfer	Private	✓	
	transferWithTax	Private	✓	
	transferWithoutTax	Private	✓	
	deliverBNBToAgent	External	✓	-
	notifyTaxSystem	Private	✓	

	calculateReflections	Private	✓	
	updateMultiplierBalances	Private	✓	
	updateReflections	Private	✓	
	payReflections	Private	✓	
	lastTimeReflectionsApplicable	Private		
	reflectionsPerShare	Private		
	getReflectionsMultiplier	Public		-
	swapTaxTokensForBNB	Private	✓	
	swapTokensForBNB	Private	✓	
	swapBNBForTokens	Private	✓	
	addLiquidityFromTokenReserves	Private	✓	
	refillLiquidityTokenReserves	Private	✓	
	_addMultiplier	Private	✓	
	_setBuyTaxReduction	Private	✓	
	_setSellTaxReduction	Private	✓	
	getCompressedTokenPotsSum	Private		
	getBNBPotsSumWithoutLiquidity	Private		

Inheritance Graph



Contract Flow



Domain Info

Domain Name	mythicore.io
Registry Domain ID	c06b3a9a39654b128ef40cd39b633b96-DONUTS
Creation Date	2022-07-22T16:37:58Z
Updated Date	2022-07-27T16:38:54Z
Registry Expiry Date	2023-07-22T16:37:58Z
Registrar WHOIS Server	whois.godaddy.com/
Registrar URL	http://www.godaddy.com/domains/search.aspx?ci=8990
Registrar	GoDaddy.com, LLC
Registrar IANA ID	146

The domain was created 5 months before the creation of the audit. It will expire in 8 months.

There is no public billing information, the creator is protected by the privacy settings.

Summary

The Mythic Ore contract implements an ERC20 token. This audit investigates security issues, business logic concerns and potential improvements.

Team Update 29 November 2022

The team has replied to all of the findings and has acknowledged that the remaining are not security issues.

Team's Update 14 December 2022

"7.5% locked for liquidity injection. Liquidity gathered from fees can be unlocked but we have a separate lock mechanism for that again in the contract."

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Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

The Cyberscope team

https://www.cyberscope.io