Cyberscope

Audit Report

MASTER PEPE

May 2023

Network	BSC
Address	0xce869e20b0a72b4f52431d79e100912bdfe5b6f2
Audited by	© cyberscope

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Review

Contract Name	MASTERPEPE
Compiler Version	v0.8.19+commit.7dd6d404
Optimization	200 runs
Explorer	https://bscscan.com/address/0xce869e20b0a72b4f52431d79e100912bdfe5b6f2
Address	0xce869e20b0a72b4f52431d79e100912bdfe5b6f2
Network	BSC
Symbol	Pepe
Decimals	9
Total Supply	1,000,000,000,000

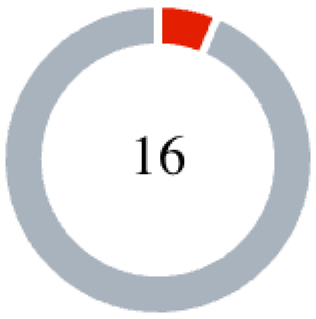
Audit Updates

Initial Audit	01 May 2023

Source Files

Filename	SHA256
MASTERPEPE.sol	402f9991c261308ad046ed2a6b9915a699992e53bc88a23d8a020ed8515a315c

Findings Breakdown



●	Critical	1
●	Medium	0
●	Minor / Informative	15

	Severity	Unresolved	Acknowledged	Resolved	Other
●	Critical	1	0	0	0
●	Medium	0	0	0	0
●	Minor / Informative	15	0	0	0

Analysis

● Critical ● Medium ● Minor / Informative ● Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Passed
●	OCTD	Transfers Contract's Tokens	Passed
●	OTUT	Transfers User's Tokens	Passed
●	ELFM	Exceeds Fees Limit	Passed
●	ULTW	Transfers Liquidity to Team Wallet	Passed
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

Diagnostics

🔴 Critical 🟠 Medium ● Minor / Informative

Severity	Code	Description	Status
🔴	UEST	Unhandled Exception Stops Transfer	Unresolved
●	CO	Code Optimization	Unresolved
●	PVC	Price Volatility Concern	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	RSK	Redundant Storage Keyword	Unresolved
●	IDI	Immutable Declaration Improvement	Unresolved
●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L05	Unused State Variable	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L12	Using Variables before Declaration	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L15	Local Scope Variable Shadowing	Unresolved

●	L16	Validate Variable Setters	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

UEST - Unhandled Exception Stops Transfer

Criticality	Critical
Location	MASTERPEPE.sol#L914
Status	Unresolved

Description

The contract uses a try-catch statement in order to performe an external call to the router contract. If the external call throw an exception, then the contract will return from the function call. As a result, the transfer will stop the execution in the middle and the `swapping` will stay locked for ever.

```
try swapRouter.swapExactTokensForETHSupportingFeeOnTransferTokens(
    contractTokenBalance,
    0,
    path,
    address(this),
    block.timestamp) {}
    catch {return;}
```

Recommendation

The team is advised to properly handle the external calls so they do not produce unexpected side-effects to the contract.

CO - Code Optimization

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L899
Status	Unresolved

Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

1. The `contractTokenBalance` could be moved to the initial `if` branch so the swapping assignment will not be executed.
2. The `success` is assigned but never used. If it is not needed by the business logic of the contract, then it could be removed.
3. The `half > 0` branch could embody both statements so it does not execute the same condition twice.

```
if(canSwap && !swapping && is_sell(from, to) && buyfee + sellfee >
0
) {
    swapping = true;

    if(contractTokenBalance > 0) {
        address[] memory path = new address[](2);
        path[0] = address(this);
        path[1] = swapRouter.WETH();

        try
swapRouter.swapExactTokensForETHSupportingFeeOnTransferTokens(
            contractTokenBalance,
            0,
            path,
            address(this),
            block.timestamp) {}
            catch {return;}


                uint256 half = address(this).balance / 2;
                bool success;
                if(half > 0) {(success,) =
marketingAddress.call{value: half, gas: 35000}("");}
                if(half > 0) {swapAndSendDividends(half);}
    }

    swapping = false;
}
```

Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

PVC - Price Volatility Concern

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L993
Status	Unresolved

Description

The contract accumulates tokens from the taxes to swap them for ETH. The variable `swapTokensAtAmount` sets a threshold where the contract will trigger the swap functionality. If the variable is set to a big number, then the contract will swap a huge amount of tokens for ETH.

It is important to note that the price of the token representing it, can be highly volatile. This means that the value of a price volatility swap involving Ether could fluctuate significantly at the triggered point, potentially leading to significant price volatility for the parties involved.

```
function setSwapTokensAtAmount(uint256 amount) external onlyOwner{
    require(amount >= totalSupply() / 1_000_000,
"SwapTokensAtAmount must be greater than 0.001% of total supply");
    swapTokensAtAmount = amount;
}
```

Recommendation

The contract could ensure that it will not sell more than a reasonable amount of tokens in a single transaction. A suggested implementation could check that the maximum amount should be less than a fixed percentage of the total supply. Hence, the contract will guarantee that it cannot accumulate a huge amount of tokens in order to sell them.

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	MASTERPEPE.sol
Status	Unresolved

Description

SafeMath is a popular Solidity library that provides a set of functions for performing common arithmetic operations in a way that is resistant to integer overflows and underflows.

Starting with Solidity versions that are greater than or equal to 0.8.0, the arithmetic operations revert on underflow and overflow. As a result, the native functionality of the Solidity operations replaces the SafeMath library. Hence, the usage of the SafeMath library adds complexity, overhead and increases the gas consumption unnecessarily.

```
library SafeMath {...}
```

Recommendation

The team is advised to remove the SafeMath library. Since the version of the contract is greater than `0.8.0` then the pure Solidity arithmetic operations produce the same result.

If the previous functionality is required, then the contract could exploit the `unchecked { ... }` statement.

Read more about the breaking change on https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes.

RSK - Redundant Storage Keyword

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L177,181,188,192
Status	Unresolved

Description

The contract uses the `storage` keyword in a view function. The `storage` keyword is used to persist data on the contract's storage. View functions are functions that do not modify the state of the contract and do not perform any actions that cost gas (such as sending a transaction). As a result, the use of the `storage` keyword in view functions is redundant.

```
Map storage map
```

Recommendation

It is generally considered good practice to avoid using the `storage` keyword in view functions, because it is unnecessary and can make the code less readable.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L804,807,822
Status	Unresolved

Description

The contract is using variables that initialize them only in the constructor. The other functions are not mutating the variables. These variables are not defined as `immutable`.

```
dividendTracker
swapRouter
lpPair
```

Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L789
Status	Unresolved

Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
6 public gasForProcessing = 300_000;
```

Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L241,459,506,510,514,518,590,624,771,772,773,774,775,776,862,867,872
Status	Unresolved

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.

```
on WETH() external pure returns (address);


6 constant internal magnitude = 2**128;

s _owner) publ
...


6 constant public sellfee = 10;


6 constant public transferfee = 0;


...
```

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.

L05 - Unused State Variable

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L126
Status	Unresolved

Description

An unused state variable is a state variable that is declared in the contract, but is never used in any of the contract's functions. This can happen if the state variable was originally intended to be used, but was later removed or never used.

Unused state variables can create clutter in the contract and make it more difficult to understand and maintain. They can also increase the size of the contract and the cost of deploying and interacting with it.

```
private constant MAX_INT256 = ~(int256(1) << 255);
```

Recommendation

To avoid creating unused state variables, it's important to carefully consider the state variables that are needed for the contract's functionality, and to remove any that are no longer needed. This can help improve the clarity and efficiency of the contract.

L07 - Missing Events Arithmetic

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L613,991
Status	Unresolved

Description

Events are a way to record and log information about changes or actions that occur within a contract. They are often used to notify external parties or clients about events that have occurred within the contract, such as the transfer of tokens or the completion of a task.

It's important to carefully design and implement the events in a contract, and to ensure that all required events are included. It's also a good idea to test the contract to ensure that all events are being properly triggered and logged.

```
ocessedIndex = index;


kensAtAmount = amount;
```

Recommendation

By including all required events in the contract and thoroughly testing the contract's functionality, the contract ensures that it performs as intended and does not have any missing events that could cause issues with its arithmetic.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L148,523,872
Status	Unresolved

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.

```
on abs(int256 a) internal pure returns (int256) {
        require(a != MIN_INT256);
        return a < 0 ? -a : a;
    }


...

        int256 _magCorrection =
magnifiedDividendPerShare.mul(value).toInt256Safe();
        magnifiedDividendCorrections[from] =
magnifiedDividendCorrections[from].add(_magCorrection);
        magnifiedDividendCorrections[to] =
magnifiedDividendCorrections[to].sub(_magCorrection);
    }



...
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

L12 - Using Variables before Declaration

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L940
Status	Unresolved

Description

The contract is using a variable before the declaration. This is usually happening either if it has not been declared yet or if the variable has been declared in a different scope. It is not a good practice to use a local variable before it has been declared.

```
claims, uint

lastProcessedIndex) {

iterations, uint
```

Recommendation

By declaring local variables before using them, contract ensures that it operates correctly. It's important to be aware of this rule when working with local variables, as using a variable before it has been declared can lead to unexpected behavior and can be difficult to debug.

L14 - Uninitialized Variables in Local Scope

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L940
Status	Unresolved

Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
6 lastProcessedIndex) {

6 iterations, uint
6 claims, uint
```

Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

L15 - Local Scope Variable Shadowing

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L468,506,510,514,518
Status	Unresolved

Description

Local scope variable shadowing occurs when a local variable with the same name as a variable in an outer scope is declared within a function or code block. When this happens, the local variable "shadows" the outer variable, meaning that it takes precedence over the outer variable within the scope in which it is declared.

```
memory _name, stri
 memory _symbol, addr
s _owner) publ
```

Recommendation

It's important to be aware of shadowing when working with local variables, as it can lead to confusion and unintended consequences if not used correctly. It's generally a good idea to choose unique names for local variables to avoid shadowing outer variables and causing confusion.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L469
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.

```
Token = _rewardToken;
```

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.

L20 - Succeeded Transfer Check

Criticality	Minor / Informative
Location	MASTERPEPE.sol#L841
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.

```
transfer(marketingAddress, 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.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Context	Implementation			
		Public	✓	-
	_msgSender	Internal		
	_msgData	Internal		
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_setOwner	Private	✓	
SafeMath	Library			
	add	Internal		
	sub	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		

	div	Internal		
	mod	Internal		
	mod	Internal		
SafeMathInt	Library			
	mul	Internal		
	div	Internal		
	sub	Internal		
	add	Internal		
	abs	Internal		
	toUint256Safe	Internal		
SafeMathUint	Library			
	toInt256Safe	Internal		
ERC20	Implementation	Context, IERC20, IERC20Metadata		
		Public	✓	-
	name	Public		-
	symbol	Public		-
	decimals	Public		-
	totalSupply	Public		-
	balanceOf	Public		-

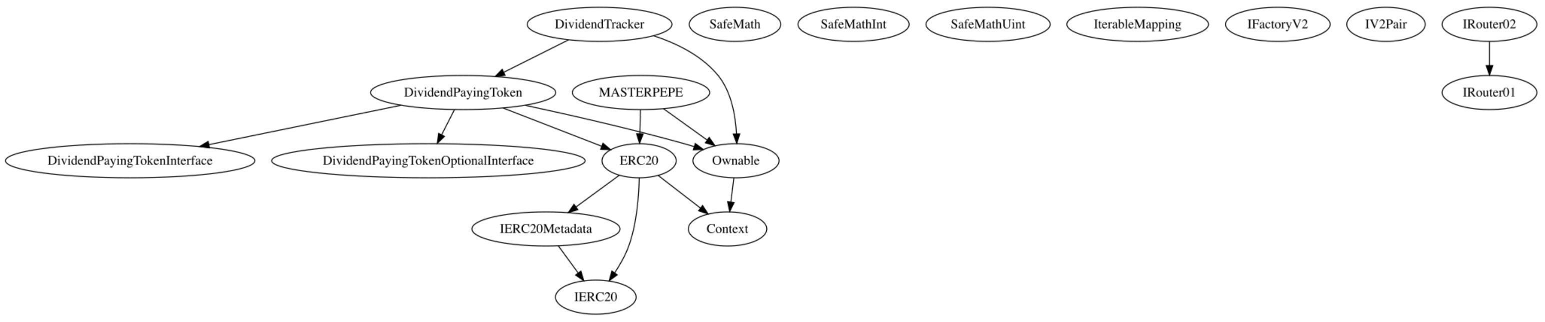
	transfer	Public	✓	-
	allowance	Public		-
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	_transfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_approve	Internal	✓	
	_beforeTokenTransfer	Internal	✓	
DividendPayingTokenInterface	Interface			
	dividendOf	External		-
	withdrawDividend	External	✓	-
DividendPayingTokenOptionalInterface	Interface			
	withdrawableDividendOf	External		-
	withdrawnDividendOf	External		-
	accumulativeDividendOf	External		-

DividendPayingToken	Implementation	ERC20, Ownable, DividendPayingTokenInterface, DividendPayingTokenOptionalInterface		
		Public	✓	ERC20
	distributeDividends	Public	✓	onlyOwner
	withdrawDividend	Public	✓	-
	_withdrawDividendOfUser	Internal	✓	
	dividendOf	Public		-
	withdrawableDividendOf	Public		-
	withdrawnDividendOf	Public		-
	accumulativeDividendOf	Public		-
	_transfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_setBalance	Internal	✓	
DividendTracker	Implementation	Ownable, DividendPayingToken		
		Public	✓	DividendPayingToken
	_transfer	Internal		
	withdrawDividend	Public		-
	updateMinimumTokenBalanceForDividends	External	✓	onlyOwner
	excludeFromDividends	External	✓	onlyOwner

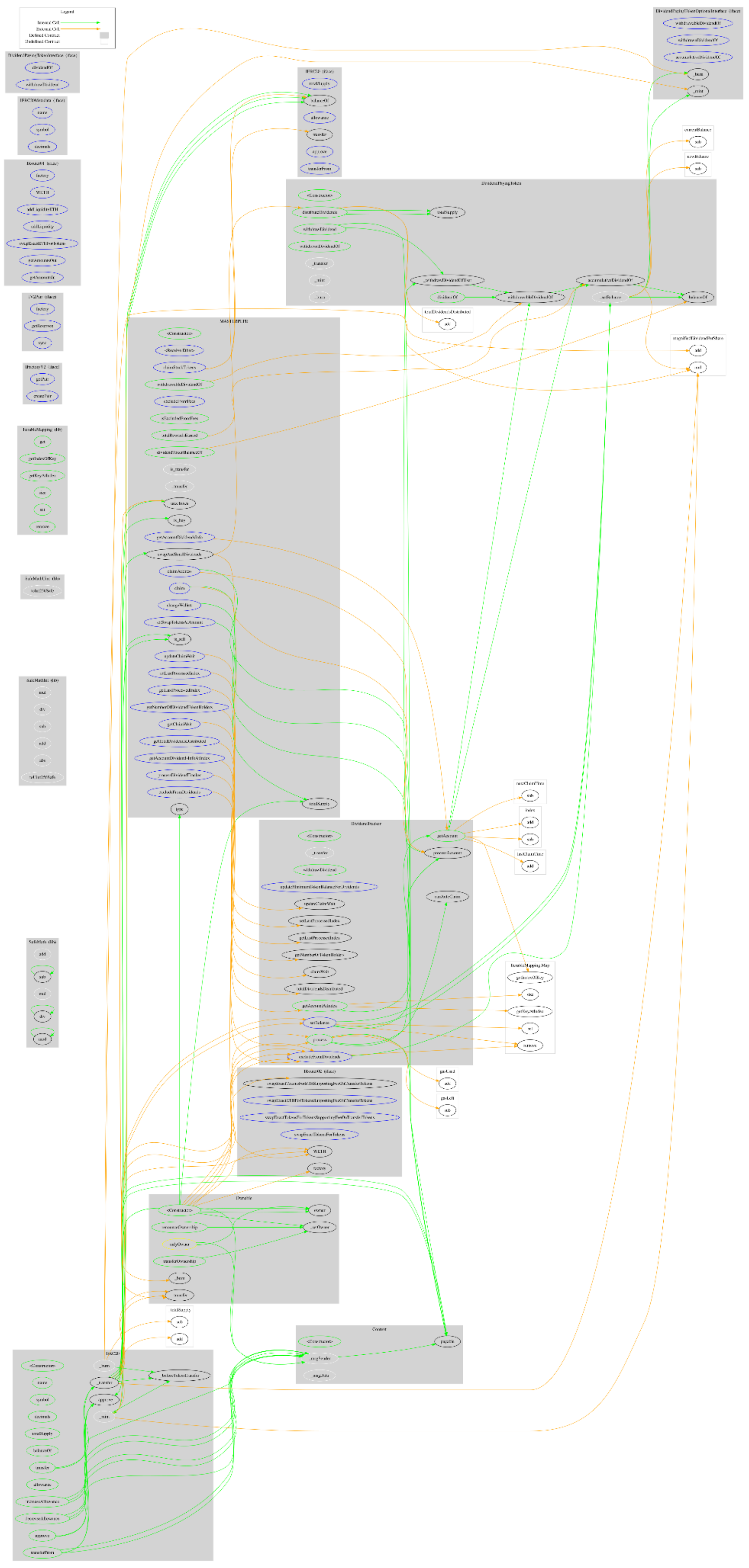
	updateClaimWait	External	✓	onlyOwner
	setLastProcessedIndex	External	✓	onlyOwner
	getLastProcessedIndex	External		-
	getNumberOfTokenHolders	External		-
	getAccount	Public		-
	getAccountAtIndex	Public		-
	canAutoClaim	Private		
	setBalance	External	✓	onlyOwner
	process	Public	✓	-
	processAccount	Public	✓	onlyOwner
MASTERPEPE	Implementation	ERC20, Ownable		
		Public	Payable	ERC20
		External	Payable	-
	claimStuckTokens	External	✓	-
	changeWallets	External	✓	onlyOwner
	excludeFromFees	External	✓	onlyOwner
	isExcludedFromFees	Public		-
	is_buy	Internal		
	is_sell	Internal		
	is_transfer	Internal		
	_transfer	Internal	✓	
	takeTaxes	Internal	✓	

	swapAndSendDividends	Private	✓	
	setSwapTokensAtAmount	External	✓	onlyOwner
	updateClaimWait	External	✓	onlyOwner
	getClaimWait	External		-
	getTotalDividendsDistributed	External		-
	withdrawableDividendOf	Public		-
	dividendTokenBalanceOf	Public		-
	totalRewardsEarned	Public		-
	excludeFromDividends	External	✓	onlyOwner
	getAccountDividendsInfo	External		-
	getAccountDividendsInfoAtIndex	External		-
	processDividendTracker	External	✓	-
	claim	External	✓	-
	claimAddress	External	✓	onlyOwner
	getLastProcessedIndex	External		-
	setLastProcessedIndex	External	✓	onlyOwner
	getNumberOfDividendTokenHolders	External		-

Inheritance Graph



Flow Graph



Summary

MASTER PEPE contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements. MASTER PEPE is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler error or critical issues. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions. The fees are fixed to 10%.

Disclaimer

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Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

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