Cyberscope

Audit Report

Capone

May 2023

Network BSC

Address 0xd3283BB6A006c510b7D3A0f2f051F991208a89e2

Audited by © cyberscope

Table of Contents

Review

Contract Name	CAPONE
Compiler Version	v0.8.4+commit.c7e474f2
Optimization	99999 runs
Explorer	https://bscscan.com/address/0xd3283bb6a006c510b7d3a0f2f051f991208a89e2
Address	0xd3283bb6a006c510b7d3a0f2f051f991208a89e2
Network	BSC
Symbol	CAPONE
Decimals	18
Total Supply	10.000.000.000

Audit Updates

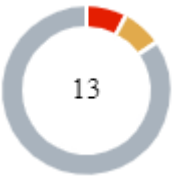
Initial Audit	16 May 2023

Source Files

Filename	SHA256
@openzeppelin/contracts/access/AccessControl.sol	0ab66c9c0b45fca5efad935058e889bd5bb5599eb95b0d17ec924f64ebcaf38f
@openzeppelin/contracts/access/IAccessControl.sol	d03c1257f2094da6c86efa7aa09c1c07ebd33dd31046480c5097bc2542140e45
@openzeppelin/contracts/token/ERC20/extensions/IERC20Metadata.sol	af5c8a77965cc82c33b7ff844deb9826166689e55dc037a7f2f790d057811990
@openzeppelin/contracts/token/ERC20/IERC20.sol	94f23e4af51a18c2269b355b8c7cf4db8003d075c9c541019eb8dcf4122864d5
@openzeppelin/contracts/utils/Context.sol	1458c260d010a08e4c20a4a517882259a23a4baa0b5bd9add9fb6d6a1549814a
@openzeppelin/contracts/utils/introspection/ERC165.sol	8806a632d7b656cadb8133ff8f2acae4405b3a64d8709d93b0fa6a216a8a6154
@openzeppelin/contracts/utils/introspection/IERC165.sol	701e025d13ec6be09ae892eb029cd83b3064325801d73654847a5fb11c58b1e5
@openzeppelin/contracts/utils/math/SafeMath.sol	0dc33698a1661b22981abad8e5c6f5ebca0dfe5ec14916369a2935d888ff257a
@openzeppelin/contracts/utils/Strings.sol	8597c62818dcbc6cf85c21179b90b714fb4f70a4347ca2eed23e88c87b08b8a1
@uniswap/v2-core/contracts/interfaces/IUniswapV2Factory.sol	51d056199e3f5e41cb1a9f11ce581aa3e190cc982db5771ffeef8d8d1f962a0d
@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router01.sol	0439ffe0fd4a5e1f4e22d71ddbda76d63d61679947d158cba4ee0a1da60cf663
@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router02.sol	a2900701961cb0b6152fc073856b972564f7c798797a4a044e83d2ab8f0e8d38

contracts/CAPONE.sol	42405c4b620abc8d1ece7fe50b6527c6b9 1ca0c2dbec9f5d83c8c3853fb8d2d1
contracts/interfaces/IDistribution.sol	ea6887dbf00f53521ac4a7a1e2479998347 e8b27e73cddd997f7b271a90b99b1

Findings Breakdown



Critical	1
Medium	1
Minor / Informative	11

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	1	0	0	0
Medium	1	0	0	0
Minor / Informative	11	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
●	CR	Code Repetition	Unresolved
●	RME	Redundant Mapping Entries	Unresolved
●	AFI	Accumulated Fees Inconsistency	Unresolved
●	US	Untrusted Source	Unresolved
●	MVN	Misleading Variables Naming	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L18	Multiple Pragma Directives	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	IDI	Immutable Declaration Improvement	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L13	Divide before Multiply Operation	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

CR - Code Repetition

Criticality	Minor / Informative
Location	contracts/CAPONE.sol#L223,308,328,354
Status	Unresolved

Description

The contract contains repetitive code segments. There are potential issues that can arise when using code segments in Solidity. Some of them can lead to issues like gas efficiency, complexity, readability, security, and maintainability of the source code. It is generally a good idea to try to minimize code repetition where possible.

```
require(_rewardSwapReceivers.length ==
_rewardSwapReceiversRate.length, "size");

uint256 totalRate = 0;
for (uint256 i = 0; i < _rewardSwapReceiversRate.length; i++) {
    totalRate = totalRate.add(_rewardSwapReceiversRate[i]);
}
require(totalRate == 10000, "rate");
```

Recommendation

The team is advised to avoid repeating the same code in multiple places, which can make the contract easier to read and maintain. The authors could try to reuse code wherever possible, as this can help reduce the complexity and size of the contract. For instance, the contract could reuse the common code segments in an internal function in order to avoid repeating the same code in multiple places.

MVN - Misleading Variables Naming

Criticality	Minor / Informative
Location	contracts/CAPONE.sol#L41,438
Status	Unresolved

Description

Variables can have misleading names if their names do not accurately reflect the value they contain or the purpose they serve. The contract uses some variable names that are too generic or do not clearly convey the information stored in the variable. Misleading variable names can lead to confusion, making the code more difficult to read and understand.

The contract incorporates the capability to distribute burn fees among multiple addresses. On the contrary, the burn mechanism facilitates the transfer of tokens to a dead address for the purpose of burning them.

```
uint256 public burnFeeBuyRate;
uint256 public burnFeeSellRate;
uint256 public burnFeeTransferRate;
address[] public burnFeeReceivers;
uint256[] public burnFeeReceiversRate;

for (uint256 i = 0; i < burnFeeReceivers.length; i++) {
    _transferAmount(_from, burnFeeReceivers[i],
_calcFee(burnFeeRes, burnFeeReceiversRate[i]));
}
```

Recommendation

It's always a good practice for the contract to contain variable names that are specific and descriptive. The team is advised to keep in mind the readability of the code.

US - Untrusted Source

Criticality	Critical
Location	contracts/CAPONE.sol#L34
Status	Unresolved

Description

The contract uses an external contract in order to determine the transaction's flow. The external contract is untrusted. As a result, it may produce security issues and harm the transactions.

```
IDistribution public distribution;
```

Recommendation

The contract should use a trusted external source. A trusted source could be either a commonly recognized or an audited contract. The pointing addresses should not be able to change after the initialization. Additionally, external contract calls should be inside a try-catch statement.

AFI - Accumulated Fees Inconsistency

Criticality	Medium
Location	contracts/CAPONE.sol#L258,347,373
Status	Unresolved

Description

The contract resets the accumulated fees variables without performing a distribution of the accumulated rewards. This creates an inconsistency between the actual accumulated tokens from the fees, as the reset effectively clears the stored values without properly accounting for their distribution.

```
function resetRewardsAmount() external
onlyRole(DEFAULT_ADMIN_ROLE) {
  rewardSellAmount = 0;
  rewardBuyAmount = 0;

  emit RewardsAmountReseted();
}

function resetLiquidityFee() external
onlyRole(DEFAULT_ADMIN_ROLE) {
  liquidityFeeAmount = 0;

  emit LiquidityFeeReseted();
}

function resetSwapFee() external onlyRole(DEFAULT_ADMIN_ROLE) {
  swapFeeAmount = 0;

  emit SwapFeeReseted();
}
```

Recommendation

It is recommended to perform proper distribution of the accumulated rewards before resetting the accumulated variables. This ensures that users receive their deserved rewards based on their interactions with the contract.

RME - Redundant Mapping Entries

Criticality	Minor / Informative
Location	contracts/CAPONE.sol#L187,203,209
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.

The contract performs redundant mapping entries. The contract changes the mapping entries boolean even if they are already set to the corresponding state.

```
function setLpToken(address _lpToken, bool _lp) external
onlyRole(DEFAULT_ADMIN_ROLE) {
    require(_lpToken != address(0), "BEP20: invalid LP
address");
    require(_lpToken != pair, "ERC20: exclude default pair");

    isLpToken[_lpToken] = _lp;

    emit LpTokenUpdated(_lpToken, _lp);
}

function setExcludedFromFee(address _address, bool
_isExcludedFromFee) public onlyRole(DEFAULT_ADMIN_ROLE) {
    excludedFromFee[_address] = _isExcludedFromFee;

    emit ExcludedFromFee(_address, _isExcludedFromFee);
}

function setExcludedFromSwap(address _address, bool
_isExcludedFromSwap) public onlyRole(DEFAULT_ADMIN_ROLE) {
    excludedFromSwap[_address] = _isExcludedFromSwap;

    emit ExcludedFromSwap(_address, _isExcludedFromSwap);
}
```

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.

The contract could prevalidate that the state of the mapping is different.

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	Icontracts/CAPONE.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 to 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 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.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	contracts/CAPONE.sol#L108,109
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`.

```
name
symbol
```

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.

L13 - Divide before Multiply Operation

Criticality	Minor / Informative
Location	contracts/CAPONE.sol#L466,493
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 liquidityFeeHalf = liquidityFeeAmount.div(2)
uint256 liquidityFeeToken1Amount = _calcFee(token1Balance,
liquidityFeeHalf.mul(10000).div(amountToSwap))
```

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.

L18 - Multiple Pragma Directives

Criticality	Minor / Informative
Location	contracts/interfaces/IDistribution.sol#L2contracts/CAPONE.sol #L2@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router02.sol #L1@uniswap/v2-periphery/contracts/interfaces/IUniswapV2Router01.sol #L1@uniswap/v2-core/contracts/interfaces/IUniswapV2Factory.sol #L1@openzeppelin/contracts/utils/Strings.sol #L4@openzeppelin/contracts/utils/math/SafeMath.sol #L4@openzeppelin/contracts/utils/introspection/IERC165.sol #L4@openzeppelin/contracts/utils/introspection/ERC165.sol #L4@openzeppelin/contracts/utils/Context.sol #L4@openzeppelin/contracts/token/ERC20/IERC20.sol #L4@openzeppelin/contracts/token/ERC20/extensions/IERC20Metadata.sol #L4@openzeppelin/contracts/access/IAccessControl.sol #L4@openzeppelin/contracts/access/AccessControl.sol#L4
Status	Unresolved

Description

If the contract includes multiple conflicting pragma directives, it may produce unexpected errors. To avoid this, it's important to include the correct pragma directive at the top of the contract and to ensure that it is the only pragma directive included in the contract.

```
pragma solidity >=0.5.0;
pragma solidity >=0.6.2;
pragma solidity ^0.8.0;
pragma solidity ^0.8.2;
```

Recommendation

It is important to include only one pragma directive at the top of the contract and to ensure that it accurately reflects the version of Solidity that the contract is written in.

By including all required compiler options and flags in a single pragma directive, the potential conflicts could be avoided and ensure that the contract can be compiled correctly.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	contracts/interfaces/IDistribution.sol#L2contracts/CAPONE.sol #L2@openzeppelin/contracts/utils/Strings.sol #L4@openzeppelin/contracts/utils/math/SafeMath.sol #L4@openzeppelin/contracts/utils/introspection/IERC165.sol #L4@openzeppelin/contracts/utils/introspection/ERC165.sol #L4@openzeppelin/contracts/utils/Context.sol #L4@openzeppelin/contracts/token/ERC20/IERC20.sol #L4@openzeppelin/contracts/token/ERC20/extensions/IERC20Metadata.sol #L4@openzeppelin/contracts/access/IAccessControl.sol #L4@openzeppelin/contracts/access/AccessControl.sol#L4
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 ^0.8.2;
pragma solidity ^0.8.0;
```

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	contracts/CAPONE.sol#L198
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(_address).transfer(msg.sender, _amount)
```

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**
AccessControl	Implementation	Context, IAccessControl, ERC165		
	supportsInterface	Public		-
	hasRole	Public		-
	_checkRole	Internal		
	_checkRole	Internal		
	getRoleAdmin	Public		-
	grantRole	Public	✓	onlyRole
	revokeRole	Public	✓	onlyRole
	renounceRole	Public	✓	-
	_setupRole	Internal	✓	
	_setRoleAdmin	Internal	✓	
	_grantRole	Internal	✓	
	_revokeRole	Internal	✓	
IAccessControl	Interface			
	hasRole	External		-
	getRoleAdmin	External		-

	grantRole	External	✓	-
	revokeRole	External	✓	-
	renounceRole	External	✓	-
IERC20Metadata	Interface	IERC20		
	name	External		-
	symbol	External		-
	decimals	External		-
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
ERC165	Implementation	IERC165		
	supportsInterface	Public		-

IERC165	Interface			
	supportsInterface	External		-
SafeMath	Library			
	tryAdd	Internal		
	trySub	Internal		
	tryMul	Internal		
	tryDiv	Internal		
	tryMod	Internal		
	add	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	mod	Internal		
	sub	Internal		
	div	Internal		
	mod	Internal		
Strings	Library			
	toString	Internal		
	toHexString	Internal		
	toHexString	Internal		

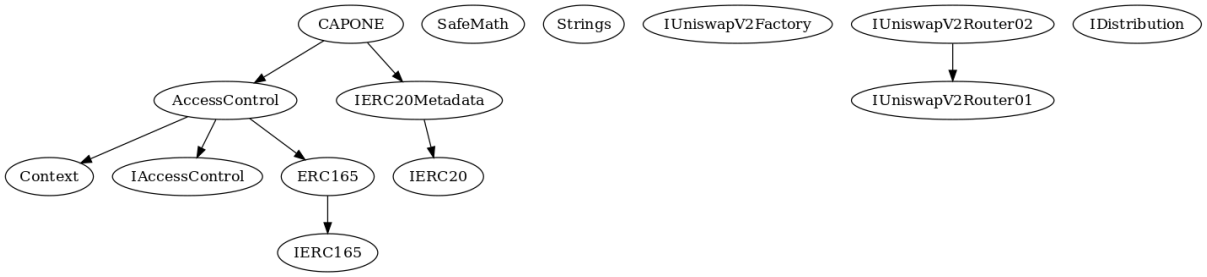
IUniswapV2Factory	Interface			
	feeTo	External		-
	feeToSetter	External		-
	getPair	External		-
	allPairs	External		-
	allPairsLength	External		-
	createPair	External	✓	-
	setFeeTo	External	✓	-
	setFeeToSetter	External	✓	-
IUniswapV2Router01	Interface			
	factory	External		-
	WETH	External		-
	addLiquidity	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	✓	-
CAPONE	Implementation	IERC20Metadata, AccessControl		
		Public	✓	-
	balanceOf	Public		-
	transfer	External	✓	-
	allowance	Public		-

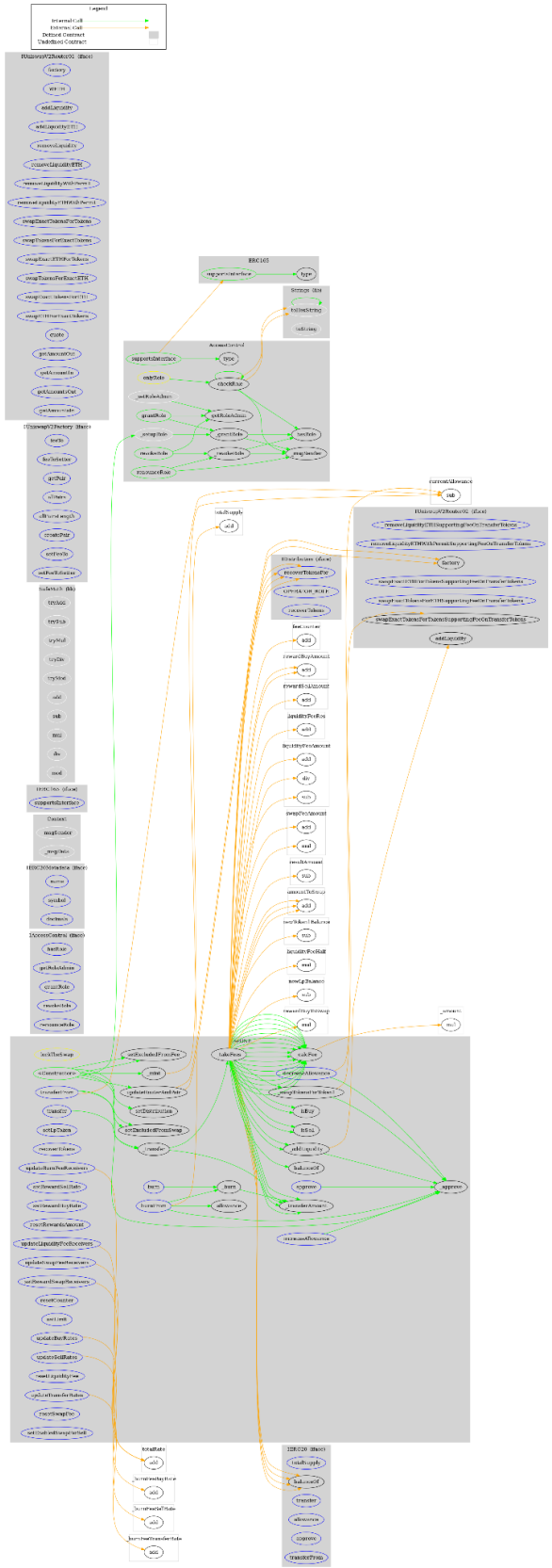
	approve	External	✓	-
	transferFrom	External	✓	-
	increaseAllowance	External	✓	-
	decreaseAllowance	External	✓	-
	updateRouterAndPair	Public	✓	onlyRole
	setLpToken	External	✓	onlyRole
	recoverTokens	External	✓	onlyRole
	setExcludedFromFee	Public	✓	onlyRole
	setExcludedFromSwap	Public	✓	onlyRole
	setDistribution	Public	✓	onlyRole
	setRewardSwapReceivers	External	✓	onlyRole
	setRewardSellRate	External	✓	onlyRole
	setRewardBuyRate	External	✓	onlyRole
	resetRewardsAmount	External	✓	onlyRole
	updateBuyRates	External	✓	onlyRole
	updateSellRates	External	✓	onlyRole
	updateTransferRates	External	✓	onlyRole
	resetCounter	External	✓	onlyRole
	setLimit	External	✓	onlyRole
	updateBurnFeeReceivers	External	✓	onlyRole
	updateLiquidityFeeReceivers	External	✓	onlyRole
	resetLiquidityFee	External	✓	onlyRole
	updateSwapFeeReceivers	External	✓	onlyRole

	resetSwapFee	External	✓	onlyRole
	setEnabledSwapForSell	External	✓	onlyRole
	burn	External	✓	-
	burnFrom	External	✓	-
	_transfer	Internal	✓	
	_takeFees	Internal	✓	
	_transferAmount	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_approve	Internal	✓	
	_calcFee	Internal		
	_isSell	Internal		
	_isBuy	Internal		
	_swapTokensForToken1	Internal	✓	lockTheSwap
	_addLiquidity	Internal	✓	lockTheSwap
IDistribution	Interface			
	OPERATOR_ROLE	External		-
	recoverTokens	External	✓	-
	recoverTokensFor	External	✓	-

Inheritance Graph



Flow Graph



Summary

Capone contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. Capone is an interesting project that has a friendly and growing community. The Smart Contract analysis reported 1 critical issue to the contract and no compiler error. The Contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions. There is also a limit of max 24% fee. Additionally, the contract has a fee limit mechanism.

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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