Cyberscope

Audit Report

ChipToken

June 2023

Network	BSC Testnet
Address	0xAaFd6C24629e60947A5e36133582f7EF92DeaCed
Audited by	© cyberscope

Analysis

Critical Medium Minor / Informative Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Passed
●	OTUT	Transfers User's Tokens	Passed
●	ELFM	Exceeds Fees Limit	Passed
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
	CO	Check Optimization	Unresolved
	MEE	Missing Events Emission	Unresolved
	RSW	Redundant Storage Writes	Unresolved
	PAV	Pair Address Validation	Unresolved
	FSA	Fixed Swap Address	Unresolved
	IDI	Immutable Declaration Improvement	Unresolved
	L02	State Variables could be Declared Constant	Unresolved
	L04	Conformance to Solidity Naming Conventions	Unresolved
	L09	Dead Code Elimination	Unresolved
	L16	Validate Variable Setters	Unresolved
	L19	Stable Compiler Version	Unresolved

Table of Contents

Analysis **1**
Diagnostics **2**
Table of Contents **3**
Review **5**
Audit Updates 5
Source Files 6
Findings Breakdown **7**
CO - Check Optimization 8
Description 8
Recommendation 8
MEE - Missing Events Emission 10
Description 10
Recommendation 11
RSW - Redundant Storage Writes 12
Description 12
Recommendation 13
PAV - Pair Address Validation 14
Description 14
Recommendation 14
FSA - Fixed Swap Address 15
Description 15
Recommendation 15
IDI - Immutable Declaration Improvement 16
Description 16
Recommendation 16
L02 - State Variables could be Declared Constant 17
Description 17
Recommendation 17
L04 - Conformance to Solidity Naming Conventions 18
Description 18
Recommendation 18
L09 - Dead Code Elimination 20
Description 20
Recommendation 20
L16 - Validate Variable Setters 22
Description 22
Recommendation 22
L19 - Stable Compiler Version 23
Description 23

Recommendation 23
Functions Analysis **24**
Inheritance Graph **30**
Flow Graph **31**
Summary **32**
Disclaimer **33**
About Cyberscope **34**

Review

Contract Name	ChipToken
Compiler Version	v0.8.0+commit.c7dfd78e
Optimization	200 runs
Explorer	https://testnet.bscscan.com/address/0xaafd6c24629e60947a5e36133582f7ef92deaced
Address	0xaafd6c24629e60947a5e36133582f7ef92deaced
Network	BSC_TESTNET
Symbol	CHIPT
Decimals	18
Total Supply	1,000,000

Audit Updates

Initial Audit	01 Jun 2023 https://github.com/cyberscope-io/audits/blob/main/chipt/v1/audit.pdf
Corrected Phase 2	03 Jun 2023 https://github.com/cyberscope-io/audits/blob/main/chipt/v2/audit.pdf
Corrected Phase 3	08 Jun 2023

Source Files

Filename	SHA256
ChipToken.sol	26b7facc3bfd2c1f9e008c5ea7dd21cc2b4f8dfeb60c09331239112162d43af6

Findings Breakdown

Critical	0
Medium	0
Minor / Informative	11

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	0	0	0
Minor / Informative	11	0	0	0

CO - Check Optimization

Criticality	Minor / Informative
Location	ChipToken.sol#L484
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 contains duplicated code segments that check if the `transferAmount` is greater than zero, which are present in an if/else statement.

```
function _transfer(address sender, address recipient, uint256 amount)
internal override {
    bool isBuy = (sender == liquidityPool || sender == burnAddress);
    bool isSell = (recipient == liquidityPool);

    if (isBuy) {
        // Apply buy fees
        uint256 transferAmount = amount;
        require(transferAmount > 0, "Amount after fee must be greater than
zero");
        ...
    } else if (isSell) {
        // Apply sell fees
        uint256 transferAmount = amount;
        require(transferAmount > 0, "Amount after fee must be greater than
zero");
        ...
    } else {
        // No fees applied
        super._transfer(sender, recipient, amount);
    }
}
```

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. It is recommended to move the check outside the if statement.

MEE - Missing Events Emission

Criticality	Minor / Informative
Location	ChipToken.sol#L425,472,4576,480
Status	Unresolved

Description

The contract performs actions and state mutations from external methods that do not result in the emission of events. Emitting events for significant actions is important as it allows external parties, such as wallets or dApps, to track and monitor the activity on the contract. Without these events, it may be difficult for external parties to accurately determine the current state of the contract.

```
function setWallets(address team, address marketing, address treasury)
external onlyOwner {
    require(team != address(0), "Cannot set team wallet to the zero
address");
    require(marketing != address(0), "Cannot set marketing wallet to the
zero address");
    require(treasury != address(0), "Cannot set treasury wallet to the zero
address");

    teamWallet = team;
    marketingWallet = marketing;
    treasuryWallet = treasury;
}

function addFeeExemptAddress(address account) external onlyOwner {
    _feeExemptAddresses[account] = true;
}

function removeFeeExemptAddress(address account) external onlyOwner {
    _feeExemptAddresses[account] = false;
}

function setLP(address _address) external onlyOwner {
    pairContract = IPancakeSwapPair(_address);
}
```

Recommendation

It is recommended to include events in the code that are triggered each time a significant action is taking place within the contract. These events should include relevant details such as the user's address and the nature of the action taken. By doing so, the contract will be more transparent and easily auditable by external parties. It will also help prevent potential issues or disputes that may arise in the future.

RSW - Redundant Storage Writes

Criticality	Minor / Informative
Location	ChipToken.sol#L425,435,472,476,480
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 updates variables even if its current state is the same as the one passed as an argument. As a result, the contract performs redundant storage writes.

```
function setWallets(address team, address marketing, address treasury)
external onlyOwner {
    require(team != address(0), "Cannot set team wallet to the zero
address");
    require(marketing != address(0), "Cannot set marketing wallet to the
zero address");
    require(treasury != address(0), "Cannot set treasury wallet to the zero
address");

    teamWallet = team;
    marketingWallet = marketing;
    treasuryWallet = treasury;
}

function setLiquidityPool(address pool) external onlyOwner {
    emit LiquidityPoolUpdated(liquidityPool, pool);
    liquidityPool = pool;
}

function addFeeExemptAddress(address account) external onlyOwner {
    _feeExemptAddresses[account] = true;
}

function removeFeeExemptAddress(address account) external onlyOwner {
    _feeExemptAddresses[account] = false;
}

function setLP(address _address) external onlyOwner {
    pairContract = IPancakeSwapPair(_address);
}
```

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.

PAV - Pair Address Validation

Criticality	Minor / Informative
Location	ChipToken.sol#L480
Status	Unresolved

Description

The contract is missing address validation in the pair address argument. The absence of validation reveals a potential vulnerability, as it lacks proper checks to ensure the integrity and validity of the pair address provided as an argument. The pair address is a parameter used in certain methods of decentralized exchanges for functions like token swaps and liquidity provisions.

The absence of address validation in the pair address argument can introduce security risks and potential attacks. Without proper validation, if the owner's address is compromised, the contract may lead to unexpected behavior like loss of funds.

```
function setLP(address _address) external onlyOwner {
    pairContract = IPancakeSwapPair(_address);
}
```

Recommendation

To mitigate the risks associated with the absence of address validation in the pair address argument, it is recommended to implement comprehensive address validation mechanisms. A recommended approach could be to verify pair existence in the decentralized application. Prior to interacting with the pair address contract, perform checks to verify the existence and validity of the contract at the provided address. This can be achieved by querying the provider's contract or utilizing external libraries that provide contract verification services.

FSA - Fixed Swap Address

Criticality	Minor / Informative
Location	ChipToken.sol#L407
Status	Unresolved

Description

The swap address is assigned once and it can not be changed. It is a common practice in decentralized exchanges to create new swap versions. A contract that cannot change the swap address may not be able to catch up to the upgrade. As a result, the contract will not be able to migrate to a new liquidity pool pair or decentralized exchange.

```
constructor() ERC20("ChipToken", "CHIPT") {
    ...
    router = IPancakeSwapRouter(0xD99D1c33F9fC3444f8101754aBC46c52416550D1);
```

Recommendation

The team is advised to add the ability to change the pair and router address in order to cover potential liquidity pool migrations. It would be better to support multiple pair addresses so the token will be able to have the same behavior in all the decentralized liquidity pairs.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	ChipToken.sol#L415,416
Status	Unresolved

Description

The contract declares state variables that their value is initialized once in the constructor and are not modified afterwards. The `immutable` is a special declaration for this kind of state variables that saves gas when it is defined.

```
router
pair
```

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	ChipToken.sol#L387,399
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.

```
address public burnAddress = 0x000000000000000000000000000000000000dEaD
uint256 public maxFee = 500
```

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	ChipToken.sol#L193,194,211,231,480
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.

```
function DOMAIN_SEPARATOR() external view returns (bytes32);
function PERMIT_TYPEHASH() external pure returns (bytes32);
function MINIMUM_LIQUIDITY() external pure returns (uint);
function WETH() external pure returns (address);
address _address
```

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.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	ChipToken.sol#L118
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.

```
function _burn(address account, uint256 amount) internal virtual {
        require(account != address(0), "ERC20: burn from the zero address");
        require(_balances[account] >= amount, "ERC20: burn amount exceeds
balance");

        _beforeTokenTransfer(account, address(0), amount);

        _balances[account] -= amount;
        _totalSupply -= amount;
        emit Transfer(account, address(0), amount);

        _afterTokenTransfer(account, address(0), amount);
    }
```

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.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	ChipToken.sol#L437
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.

```
liquidityPool = pool
```

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	ChipToken.sol#L2
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 ^0.8.0;
```

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.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
IERC20Metadata	Interface	IERC20		
	name	External		-
	symbol	External		-
	decimals	External		-
Context	Implementation			
	_msgSender	Internal		
	_msgData	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	✓	
	_afterTokenTransfer	Internal	✓	
Ownable	Implementation	Context		
		Public	✓	-

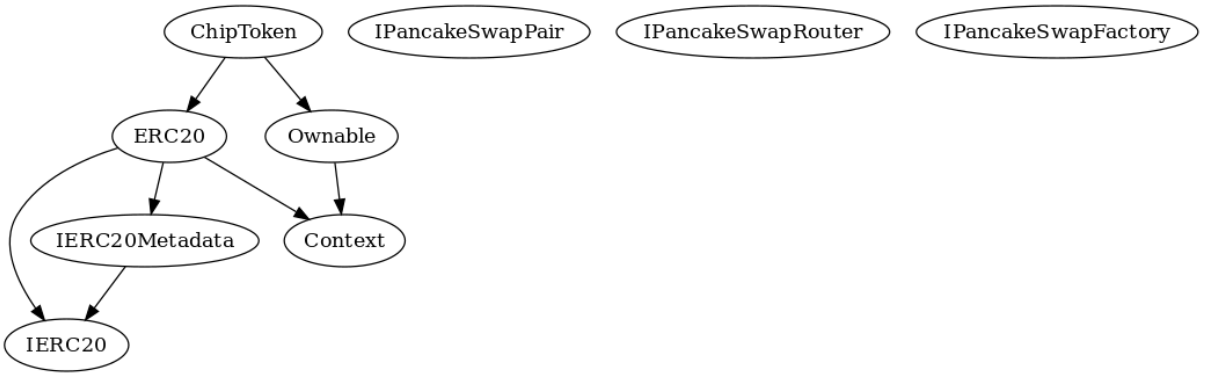
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_transferOwnership	Internal	✓	
IPancakeSwap Pair	Interface			
	name	External		-
	symbol	External		-
	decimals	External		-
	totalSupply	External		-
	balanceOf	External		-
	allowance	External		-
	approve	External	✓	-
	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		-
	mint	External	✓	-
	burn	External	✓	-
	swap	External	✓	-
	skim	External	✓	-
	sync	External	✓	-
	initialize	External	✓	-
IPancakeSwap Router	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	-

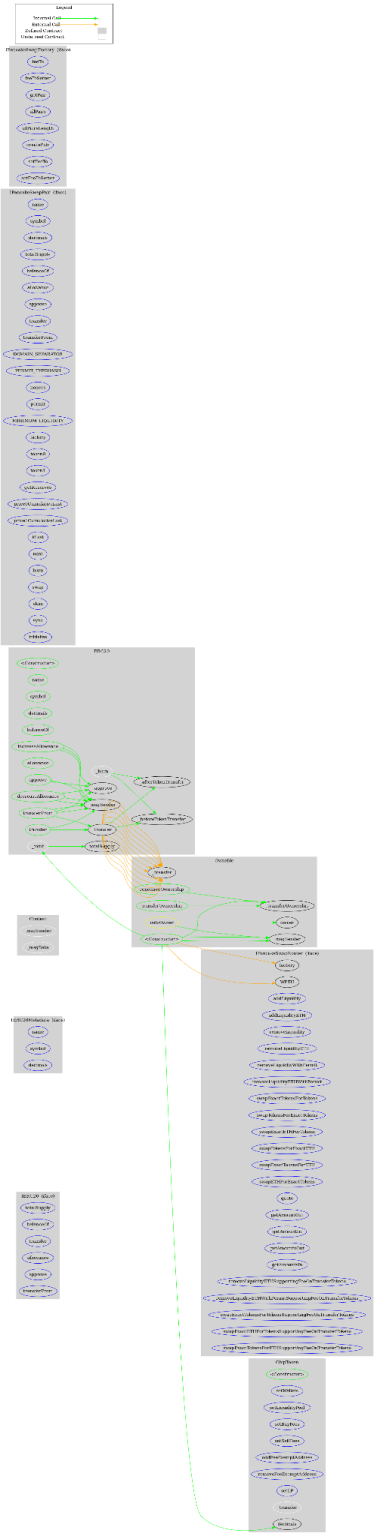
	swapTokensForExactETH	External	✓	-
	swapExactTokensForETH	External	✓	-
	swapETHForExactTokens	External	Payable	-
	quote	External		-
	getAmountOut	External		-
	getAmountIn	External		-
	getAmountsOut	External		-
	getAmountsIn	External		-
	removeLiquidityETHSupportingFeeOnTransferTokens	External	✓	-
	removeLiquidityETHWithPermitSupportingFeeOnTransferTokens	External	✓	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
IPancakeSwapFactory	Interface			
	feeTo	External		-
	feeToSetter	External		-
	getPair	External		-
	allPairs	External		-
	allPairsLength	External		-
	createPair	External	✓	-
	setFeeTo	External	✓	-

	setFeeToSetter	External	✓	-
ChipToken	Implementation	ERC20, Ownable		
		Public	✓	ERC20
	setWallets	External	✓	onlyOwner
	setLiquidityPool	External	✓	onlyOwner
	setBuyFees	External	✓	onlyOwner
	setSellFees	External	✓	onlyOwner
	addFeeExemptAddress	External	✓	onlyOwner
	removeFeeExemptAddress	External	✓	onlyOwner
	setLP	External	✓	onlyOwner
	_transfer	Internal	✓	

Inheritance Graph



Flow Graph



Summary

ChipToken contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. ChipToken is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler errors 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. There is also a limit of max 25% fee.

Disclaimer

The information provided in this report does not constitute investment, financial or trading advice and you should not treat any of the document's content as such. This report may not be transmitted, disclosed, referred to or relied upon by any person for any purposes nor may copies be delivered to any other person other than the Company without Cyberscope's prior written consent. This report is not nor should be considered an "endorsement" or "disapproval" of any particular project or team. This report is not nor should be regarded as an indication of the economics or value of any "product" or "asset" created by any team or project that contracts Cyberscope to perform a security assessment. This document does not provide any warranty or guarantee regarding the absolute bug-free nature of the technology analyzed, nor do they provide any indication of the technologies proprietors' business, business model or legal compliance. This report should not be used in any way to make decisions around investment or involvement with any particular project. This report represents an extensive assessment process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology.

Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope's position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope's goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.

About Cyberscope

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