



Cyberscope

Audit Report

Harts Coin

February 2024

Network BSC

Address 0x0f53a1Ca801E2fE03E3aE626A5d5833a7B6130B3

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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
●	IDI	Immutable Declaration Improvement	Unresolved
●	RRS	Redundant Require Statement	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	L09	Dead Code Elimination	Unresolved

Table of Contents

Analysis	1
Diagnostics	2
Table of Contents	3
Review	4
Audit Updates	4
Source Files	4
Findings Breakdown	5
IDI - Immutable Declaration Improvement	6
Description	6
Recommendation	6
RRS - Redundant Require Statement	7
Description	7
Recommendation	7
RSML - Redundant SafeMath Library	8
Description	8
Recommendation	8
L09 - Dead Code Elimination	9
Description	9
Recommendation	10
Functions Analysis	11
Inheritance Graph	14
Flow Graph	15
Summary	16
Disclaimer	17
About Cyberscope	18

Review

Contract Name	BEP20Token
Compiler Version	v0.8.10+commit.fc410830
Optimization	200 runs
Explorer	https://bscscan.com/address/0x0f53a1ca801e2fe03e3ae626a5d5833a7b6130b3
Address	0x0f53a1ca801e2fe03e3ae626a5d5833a7b6130b3
Network	BSC
Symbol	HRTX
Decimals	18
Total Supply	2,350,000,000,000
Badge Eligibility	Yes

Audit Updates

Initial Audit	08 Feb 2024
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Source Files

Filename	SHA256
contracts/HartsCoin.sol	8f2065a57283259598098f3dbbfeffeb9a564b26e9e0e0f53aafcb252d54a ae20

Findings Breakdown



Critical	0
Medium	0
Minor / Informative	4

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	0	0	0
Minor / Informative	4	0	0	0

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	contracts/HartsCoin.sol#L355
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.

```
_decimals
```

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.

RRS - Redundant Require Statement

Criticality	Minor / Informative
Location	contracts/HartsCoin.sol#L143
Status	Unresolved

Description

The contract utilizes a `require` statement within the `add` function aiming to prevent overflow errors. This function is designed based on the SafeMath library's principles. In Solidity version 0.8.0 and later, arithmetic operations revert on overflow and underflow, making the overflow check within the function redundant. This redundancy could lead to extra gas costs and increased complexity without providing additional security.

```
function add(uint256 a, uint256 b) internal pure returns
(uint256) {
    uint256 c = a + b;
    require(c >= a, "SafeMath: addition overflow");
    return c;
}
```

Recommendation

It is recommended to remove the `require` statement from the `add` function since the contract is using a Solidity pragma version equal to or greater than 0.8.0. By doing so, the contract will leverage the built-in overflow and underflow checks provided by the Solidity language itself, simplifying the code and reducing gas consumption. This change will uphold the contract's integrity in handling arithmetic operations while optimizing for efficiency and cost-effectiveness.

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	contracts/HartsCoin.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>.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	contracts/HartsCoin.sol#L525,560
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 {
    require(account != address(0), "BEP20: burn from the zero address");

    _balances[account] = _balances[account].sub(amount, "BEP20: burn amount exceeds balance");
    _totalSupply = _totalSupply.sub(amount);
    emit Transfer(account, address(0), amount);
}

function _burnFrom(address account, uint256 amount) internal {
    _burn(account, amount);
    _approve(account, _msgSender(),
    _allowances[account][_msgSender()].sub(amount, "BEP20: burn amount exceeds allowance"));
}
```

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.

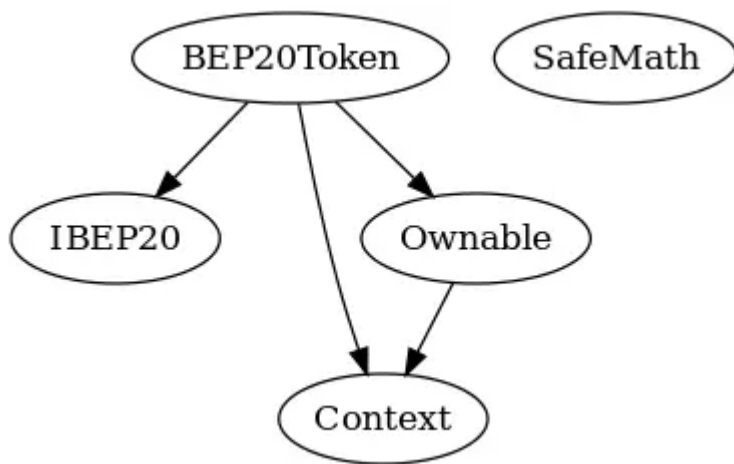
Functions Analysis

Contract	Type	Bases		
	Function Name	Visibility	Mutability	Modifiers
IBEP20	Interface			
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	getOwner	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Context	Implementation			
		Public	✓	-
	_msgSender	Internal		
	_msgData	Internal		
SafeMath	Library			
	add	Internal		

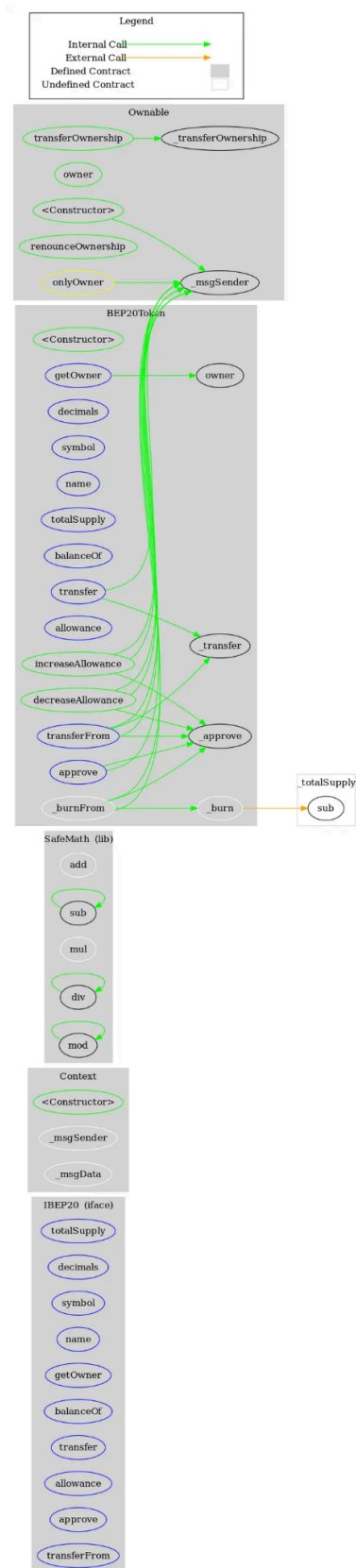
	sub	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	div	Internal		
	mod	Internal		
	mod	Internal		
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner
	_transferOwnership	Internal	✓	
BEP20Token	Implementation	Context, IBEP20, Ownable		
		Public	✓	-
	getOwner	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	totalSupply	External		-
	balanceOf	External		-

	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	_transfer	Internal	✓	
	_burn	Internal	✓	
	_approve	Internal	✓	
	_burnFrom	Internal	✓	

Inheritance Graph



Flow Graph



Summary

Harts Coin contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements. Harts Coin 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.

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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>