Cyberscope

Audit Report

IMAL

July 2023

Network	BSC
Address	0x29e6b9061AC69271e29945e29254e6238D34dA78
Audited by	© cyberscope

Analysis

● Critical ● Medium ● Minor / Informative ● Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Unresolved
●	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
●	US	Untrusted Source	Unresolved
●	RSW	Redundant Storage Writes	Unresolved
●	MEE	Missing Events Emission	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L08	Tautology or Contradiction	Unresolved
●	L11	Unnecessary Boolean equality	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L19	Stable Compiler Version	Unresolved

Table of Contents

Review

Contract Name	Imal
Compiler Version	v0.8.0+commit.c7dfd78e
Optimization	200 runs
Explorer	https://bscscan.com/address/0x29e6b9061ac69271e29945e29254e6238d34da78
Address	0x29e6b9061ac69271e29945e29254e6238d34da78
Network	BSC
Symbol	imal
Decimals	18
Total Supply	99,999,999,999

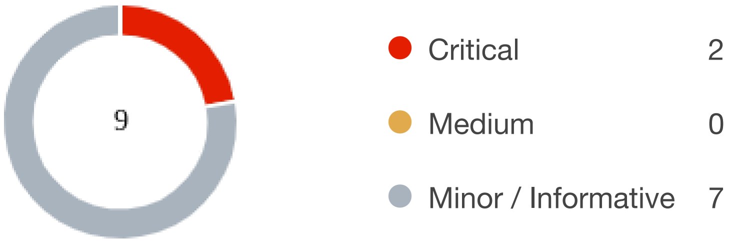
Audit Updates

Initial Audit	20 Jul 2023

Source Files

Filename	SHA256
Imal.sol	fa46f5178d532c501e2fb2a150219c242451e688145667615ccada4da65f19e0

Findings Breakdown



Severity	Unresolved	Acknowledged	Resolved	Other
● Critical	2	0	0	0
● Medium	0	0	0	0
● Minor / Informative	7	0	0	0

ST - Stops Transactions

Criticality	Critical
Location	Imal.sol#L347
Status	Unresolved

Description

The transactions are initially disabled for all users excluding the authorized addresses. The owner can enable the transactions for all users. Once the transactions are enable the owner will not be able to disable them again.

```
        if (!tradingEnabled) {
             require(sender == owner() || recipient == owner(),
"Trading is disabled!");
         }
```

Recommendation

The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

US - Untrusted Source

Criticality	Critical
Location	Imal.sol#L287,338
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.

```
   function setBPAddrss(address _bp) external onlyOwner {
        require(address(BP) == address(0), "Can only be
initialized once");
        BP = BPContract(_bp);
    }

    function _transfer(
        address sender,
        address recipient,
        uint256 amount
    ) private {
        ...
        if (bpEnabled && !BPDisabledForever) {
            BP.protect(sender, recipient, amount);
        }
    }
```

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.

RSW - Redundant Storage Writes

Criticality	Minor / Informative
Location	Imal.sol#L313
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 update the state of excluded addresses even if their current state is the same as the the one passed as an argument. As a result, the contract performs redundant storage writes.

```
    function excludeFromFee(address address_, bool isExcluded)
external onlyOwner {
        isExcludedFromFee[address_] = isExcluded;
    }
```

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.

MEE - Missing Events Emission

Criticality	Minor / Informative
Location	Imal.sol#L287,292,296,313
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 setBPAddrss(address _bp) external onlyOwner {
        require(address(BP) == address(0), "Can only be
initialized once");
        BP = BPContract(_bp);
    }

    function setBpEnabled(bool _enabled) external onlyOwner {
        bpEnabled = _enabled;
    }

    function setBotProtectionDisableForever() external
onlyOwner {
        require(BPDisabledForever == false);
        BPDisabledForever = true;
    }

    function excludeFromFee(address address_, bool isExcluded)
external onlyOwner {
        isExcludedFromFee[address_] = isExcluded;
    }
```

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.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	Imal.sol#L213,215,228,287,292
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.

```
BPContract public BP
bool public BPDisabledForever = false
bool _tradingEnabled
address _bp
bool _enabled
```

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.

L08 - Tautology or Contradiction

Criticality	Minor / Informative
Location	Imal.sol#L303
Status	Unresolved

Description

A tautology is a logical statement that is always true, regardless of the values of its variables. A contradiction is a logical statement that is always false, regardless of the values of its variables.

Using tautologies or contradictions can lead to unintended behavior and can make the code harder to understand and maintain. It is generally considered good practice to avoid tautologies and contradictions in the code.

```
require(feePercentage_ >= 0, "Imal: transaction fee percentage
equals 0")
```

Recommendation

The team is advised to carefully consider the logical conditions is using in the code and ensure that it is well-defined and make sense in the context of the smart contract.

L11 - Unnecessary Boolean equality

Criticality	Minor / Informative
Location	Imal.sol#L297
Status	Unresolved

Description

Boolean equality is unnecessary when comparing two boolean values. This is because a boolean value is either true or false, and there is no need to compare two values that are already known to be either true or false.

it's important to be aware of the types of variables and expressions that are being used in the contract's code, as this can affect the contract's behavior and performance. The comparison to boolean constants is redundant. Boolean constants can be used directly and do not need to be compared to true or false.

```
require(BPDisabledForever == false)
```

Recommendation

Using the boolean value itself is clearer and more concise, and it is generally considered good practice to avoid unnecessary boolean equalities in Solidity code.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	Imal.sol#L222,309
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.

```
beneficiaryAddress = beneficiaryAddress_
```

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	Imal.sol#L11,93,118,186
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.

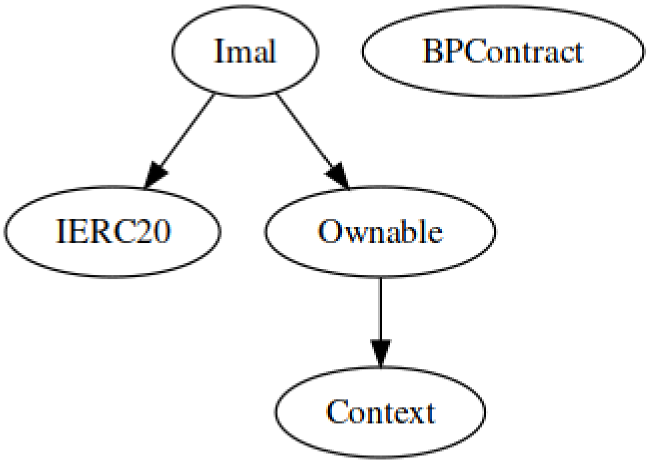
Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Context	Implementation			
	_msgSender	Internal		
	_msgData	Internal		
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner

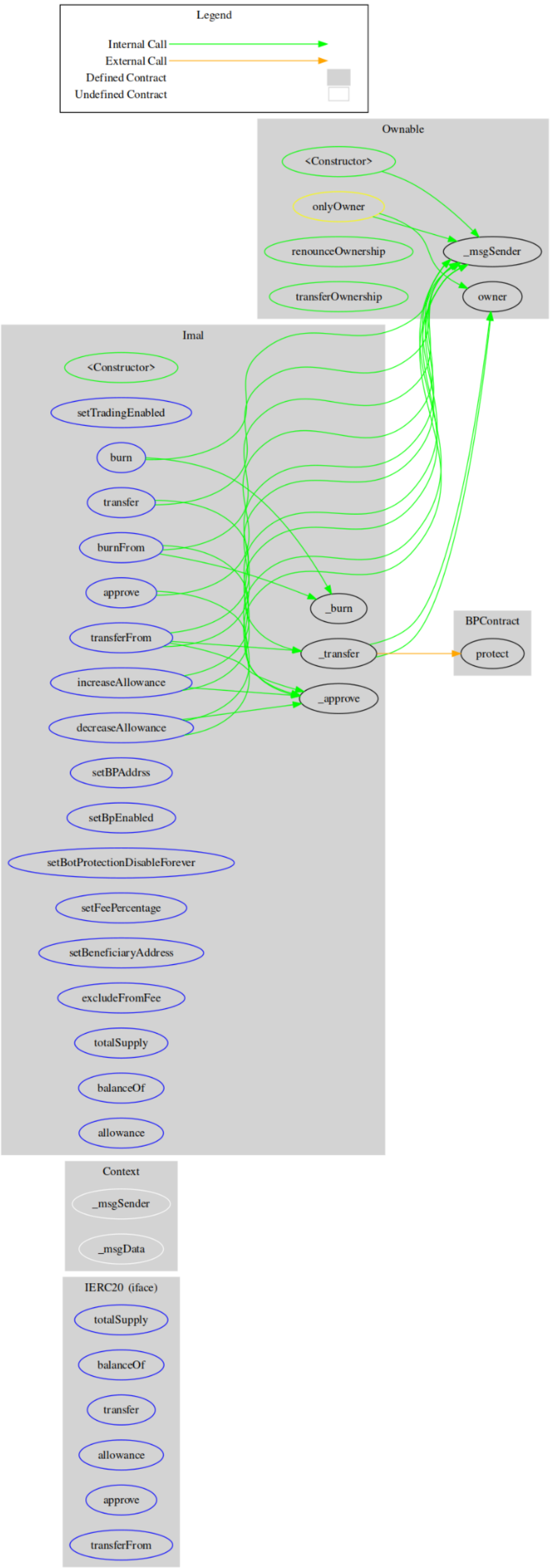
BPContract	Implementation			
	protect	External	✓	-
Imal	Implementation	IERC20, Ownable		
		Public	✓	-
	setTradingEnabled	External	✓	onlyOwner
	burn	External	✓	-
	burnFrom	External	✓	-
	transfer	External	✓	-
	approve	External	✓	-
	transferFrom	External	✓	-
	increaseAllowance	External	✓	-
	decreaseAllowance	External	✓	-
	setBPAddrss	External	✓	onlyOwner
	setBpEnabled	External	✓	onlyOwner
	setBotProtectionDisableForever	External	✓	onlyOwner
	setFeePercentage	External	✓	onlyOwner
	setBeneficiaryAddress	External	✓	onlyOwner
	excludeFromFee	External	✓	onlyOwner
	totalSupply	External		-
	balanceOf	External		-
	allowance	External		-
	_transfer	Private	✓	

	_burn	Private	✓	
	_approve	Private	✓	

Inheritance Graph



Flow Graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
Ownable
<Constructor>
onlyOwner
renounceOwnership
transferOwnership
_msgSender
owner
Imal
<Constructor>
setTradingEnabled
burn
transfer
burnFrom
approve
transferFrom
increaseAllowance
decreaseAllowance
setBPAddrss
setBpEnabled
setBotProtectionDisableForever
setFeePercentage
setBeneficiaryAddress
excludeFromFee
totalSupply
balanceOf
allowance
_burn
_transfer
_approve
BPContract
protect
Context
_msgSender
_msgData
IERC20 (iface)
totalSupply
balanceOf
transfer
allowance
approve
transferFrom

Summary

IMAL contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements. There are some functions that can be abused by the owner like stop transactions. A multi-wallet signing pattern will provide security against potential hacks. Temporarily locking the contract will eliminate all the contract threats. There is also a limit of max 10% fees.

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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

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