Cyberscope

Audit Report

Kennedy Memecoin

May 2024

SHA256 4a73198d54670657b4fd222cf81bc871beae8cb04ebba840783dc984fb252dd5

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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
●	EIS	Excessively Integer Size	Unresolved
●	PLPI	Potential Liquidity Provision Inadequacy	Unresolved
●	PTRP	Potential Transfer Revert Propagation	Unresolved
●	PVC	Price Volatility Concern	Unresolved
●	OCTD	Transfers Contract's Tokens	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L18	Multiple Pragma Directives	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

Table of Contents

Review

Contract Name	Bobby
Testing Deploy	https://testnet.bscscan.com/address/0xd033ab0bb64435801abeae5747ea7733ceaf6744
Symbol	BOBBY
Decimals	18
Total Supply	47,000,000,000
Badge Eligibility	Yes

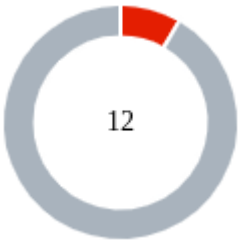
Audit Updates

Initial Audit	27 May 2024

Source Files

Filename	SHA256
contracts/Bobby.sol	4a73198d54670657b4fd222cf81bc871beae8cb04ebba840783dc984fb252dd5

Findings Breakdown



Critical	1
Medium	0
Minor / Informative	11

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	1	0	0	0
Medium	0	0	0	0
Minor / Informative	11	0	0	0

ST - Stops Transactions

Criticality	Critical
Location	contracts/Bobby.sol
Status	Unresolved

Description

the contract owner has the authority to stop transactions, as described in detail in section `PTRP`. As a result, the contract might operate as a honeypot.

Recommendation

The team is advised to follow the recommendations outlined in the `PTRP` finding and implement the necessary steps to mitigate the identified risk, ensuring that the contract does not operate as a honeypot.

EIS - Excessively Integer Size

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L193
Status	Unresolved

Description

The contract is using a bigger unsigned integer data type that the maximum size that is required. By using an unsigned integer data type larger than necessary, the smart contract consumes more storage space and requires additional computational resources for calculations and operations involving these variables. This can result in higher transaction costs, longer execution times, and potential scalability bottlenecks.

Since the maximum value for `transferFee`, `buyFee`, and `sellFee` is `2`, it is feasible to utilize `uint8` instead of `uint256` for these variables, which will save storage space and optimize the contract's performance.

```
uint256 public transferFee = 2;
uint256 public buyFee = 2;
uint256 public sellFee = 2;
```

Recommendation

To address the inefficiency associated with using an oversized unsigned integer data type, it is recommended to accurately determine the required size based on the range of values the variable needs to represent.

PLPI - Potential Liquidity Provision Inadequacy

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L273
Status	Unresolved

Description

The contract operates under the assumption that liquidity is consistently provided to the pair between the contract's token and the native currency. However, there is a possibility that liquidity is provided to a different pair. This inadequacy in liquidity provision in the main pair could expose the contract to risks. Specifically, during eligible transactions, where the contract attempts to swap tokens with the main pair, a failure may occur if liquidity has been added to a pair other than the primary one. Consequently, transactions triggering the swap functionality will result in a revert.

```
path[0] = address(this);
path[1] = _uniswapV2Router.WETH();
_uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTo
kens(
    swapTokensAtAmount,
    0,
    path,
    marketingWallet,
    block.timestamp
);
```

Recommendation

The team is advised to implement a runtime mechanism to check if the pair has adequate liquidity provisions. This feature allows the contract to omit token swaps if the pair does not have adequate liquidity provisions, significantly minimizing the risk of potential failures.

Furthermore, the team could ensure the contract has the capability to switch its active pair in case liquidity is added to another pair.

Additionally, the contract could be designed to tolerate potential reverts from the swap functionality, especially when it is a part of the main transfer flow. This can be achieved by

executing the contract's token swaps in a non-reversible manner, thereby ensuring a more resilient and predictable operation.

PTRP - Potential Transfer Revert Propagation

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L279
Status	Unresolved

Description

The contract sends funds to a `marketingWallet` as part of the transfer flow. This address can either be a wallet address or a contract. If the address belongs to a contract then it may revert from incoming payment. As a result, the error will propagate to the token's contract and revert the transfer.

```
if (swapTokensAtAmount > 0) {
    address[] memory path = new address[](2);
    path[0] = address(this);
    path[1] = _uniswapV2Router.WETH();
    _uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens(
        swapTokensAtAmount,
        0,
        path,
        marketingWallet,
        block.timestamp
    );
```

Recommendation

The contract should tolerate the potential revert from the underlying contracts when the interaction is part of the main transfer flow. This could be achieved by not allowing set contract addresses or by sending the funds in a non-revertable way.

PVC - Price Volatility Concern

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L217
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.

```
if (!swapping && automatedMarketMakerPairs[to] &&
!_isExcludedFromFees[from] && balanceOf(address(this)) >
swapTokensAtAmount) {
    swapping = true;
    swapBack();
```

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 exchange reserves. Hence, the contract will guarantee that it cannot accumulate a huge amount of tokens in order to sell them.

OCTD - Transfers Contract's Tokens

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L245
Status	Unresolved

Description

The contract marketing wallet has the authority to claim all the balance of the contract. The owner may take advantage of it by calling the `retrieveStuckToken` function.

```
function retrieveStuckToken(address tokenAddress) external
onlyMarketing {
    IERC20(tokenAddress).transfer(marketingWallet,
IERC20(tokenAddress).balanceOf(address(this)));
}
```

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.

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Prevent the retrieve of the `address.this` tokens from the contract.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L6,234,257,261
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 WETH() external pure returns (address);
uint256 _sellFee
uint256 _transferFee
uint256 _buyFee
uint256 _amount
address _marketingWallet
```

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.

L07 - Missing Events Arithmetic

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L236,254,258,266
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.

```
transferFee = _transferFee;
buyFee = _buyFee;
sellFee = _sellFee;
swapTokensAtAmount = _amount
_isExcludedFromFees[account] = excluded;
marketingWallet = _marketingWallet;
```

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	contracts/Bobby.sol#L152
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");

        uint256 accountBalance = _balances[account];
        require(accountBalance >= amount, "ERC20: burn amount
exceeds balance");
        unchecked {
            _balances[account] = accountBalance - amount;
            _totalSupply -= amount;
        }

        emit Transfer(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.

L18 - Multiple Pragma Directives

Criticality	Minor / Informative
Location	contracts/Bobby.sol#L2,3
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 ^0.8.20;
pragma experimental ABIEncoderV2;
```

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/Bobby.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 ^0.8.20;
```

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/Bobby.sol#L246
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(tokenAddress).transfer(marketingWallet,
IERC20(tokenAddress).balanceOf(address(this)))
```

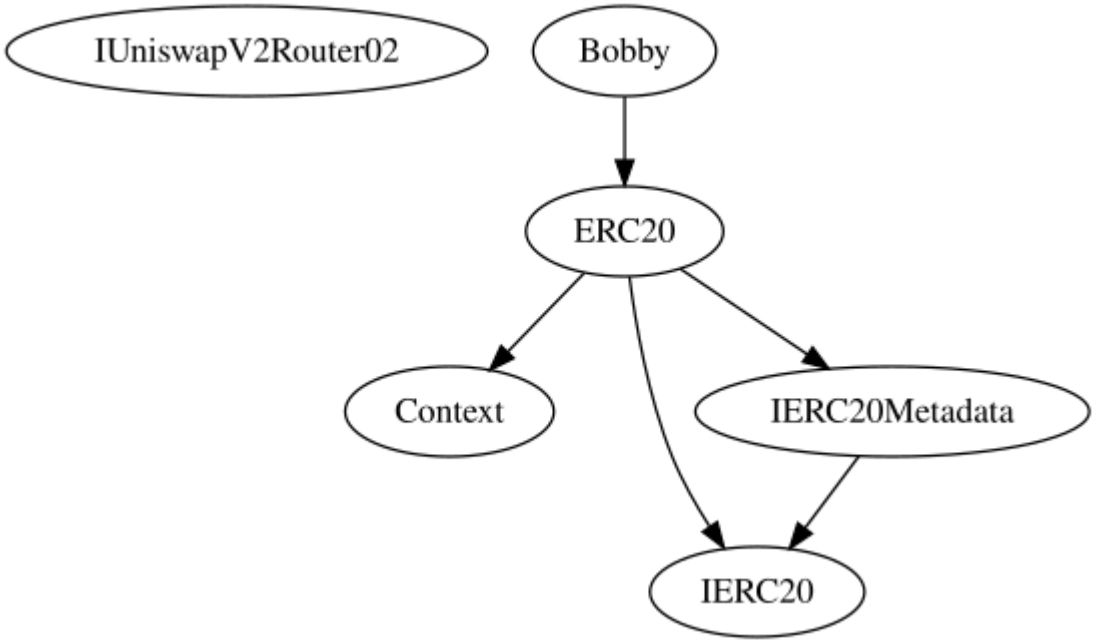
Recommendation

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.

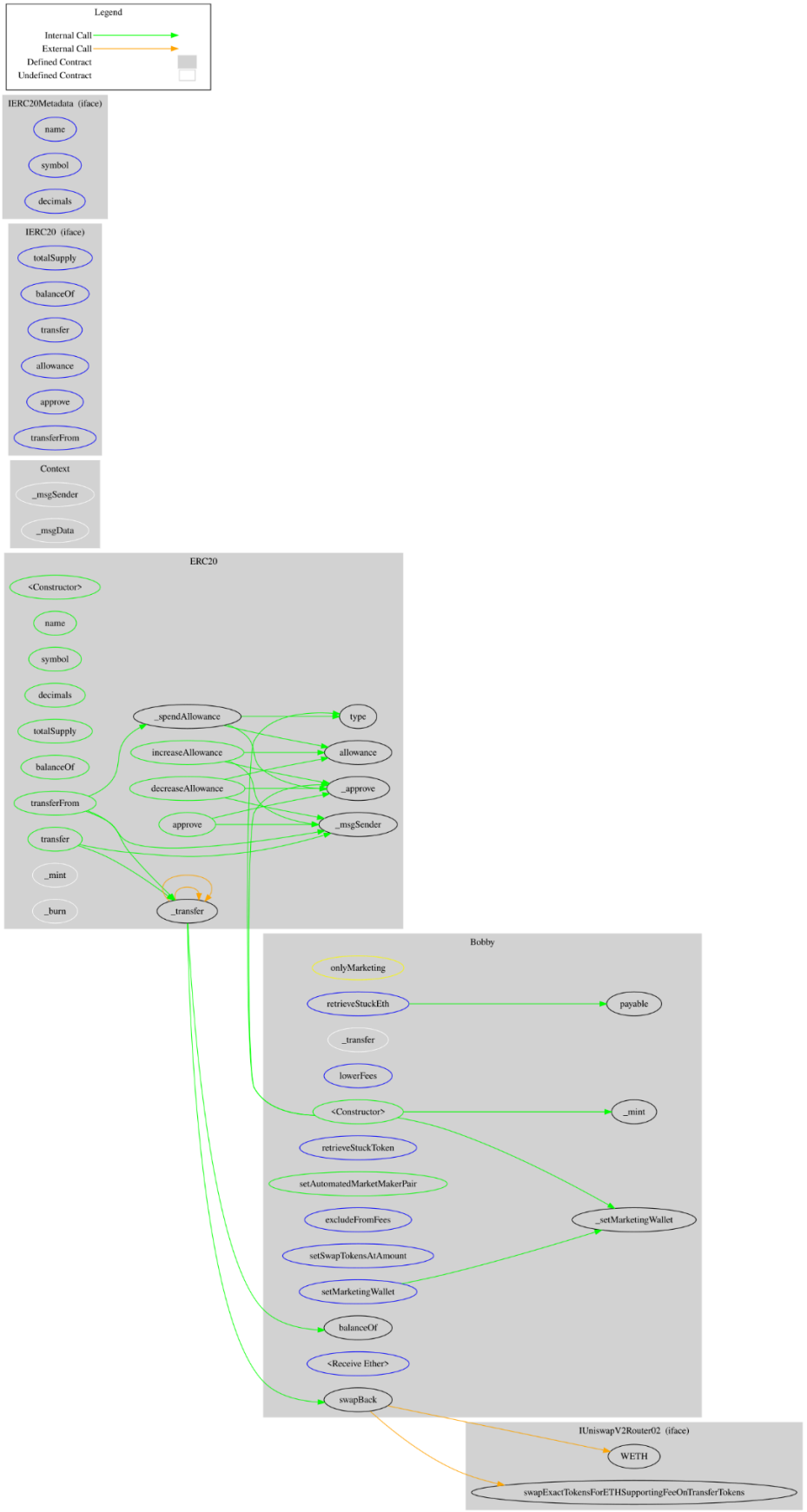
Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Bobby	Implementation	ERC20		
		Public	✓	ERC20
	_transfer	Internal	✓	
	lowerFees	External	✓	onlyMarketing
	retrieveStuckEth	External	✓	onlyMarketing
	retrieveStuckToken	External	✓	onlyMarketing
	setAutomatedMarketMakerPair	Public	✓	onlyMarketing
	excludeFromFees	External	✓	onlyMarketing
	setSwapTokensAtAmount	External	✓	onlyMarketing
	setMarketingWallet	External	✓	onlyMarketing
	_setMarketingWallet	Private	✓	
	swapBack	Private	✓	
		External	Payable	-

Inheritance Graph



Flow Graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
IERC20Metadata (iface)
name
symbol
decimals
IERC20 (iface)
totalSupply
balanceOf
transfer
allowance
approve
transferFrom
Context
_msgSender
_msgData
ERC20
<Constructor>
name
symbol
decimals
totalSupply
balanceOf
transferFrom
transfer
_mint
_burn
_spendAllowance
increaseAllowance
decreaseAllowance
approve
_transfer
type
allowance
_approve
_msgSender
Bobby
onlyMarketing
retrieveStuckEth
payable
_transfer
lowerFees
<Constructor>
_mint
retrieveStuckToken
setAutomatedMarketMakerPair
excludeFromFees
setSwapTokensAtAmount
setMarketingWallet
_setMarketingWallet
balanceOf
<Receive Ether>
swapBack
IUniswapV2Router02 (iface)
WETH
swapExactTokensForETHSupportingFeeOnTransferTokens

Summary

Kennedy Memecoin 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 or renouncing ownership will eliminate all the contract threats. There is also a limit of max 2% fees.

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The Cyberscope team

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