ASTROBIATECH
BLOCKCHAIN SECURITY

MADE IN INDIA
BLOCKCHAIN SECURITY

# SECURITY ASSESSMENT REPORT

**PREPARED FOR**

**Mentalmatics**

@astrobiatech

Nov
2023

astrobiatech.in

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## SCOPE OF AUDIT

The scope of this audit was to analyze and document the Mentalmatics smart contract codebase for quality, security, and correctness.

## CHECKED VULNERABILITIES

We have scanned the smart contract for commonly known and morespecific vulnerabilities. Here are some of the commonly known vulnerabilities that we considered:

- Re-entrancy
- Timestamp Dependence
- Gas Limit and Loops
- DoS with Block Gas Limit
- Transaction-Ordering Dependence
- Use of tx.origin
- Exception disorder
- Gasless send
- Balance equality
- Byte array
- Transfer forwards all gas
- ERC20 API violation
- Malicious libraries
- Compiler version not fixed
- Redundant fallback function
- Send instead of transfer
- Style guide violation
- Unchecked external call
- Unchecked math
- Unsafe type inference
- Implicit visibility level

# TECHNIQUES & METHODS

Throughout the audit of smart contract, care was taken to ensure:

- The overall quality of code.
- Use of best practices.
- Code documentation and comments match logic and expected behaviour.
- Token distribution and calculations are as per the intended behaviour mentioned in the whitepaper.
- Implementation of ERC-20 token standards.
- Efficient use of gas.
- Code is safe from re-entrancy and other vulnerabilities.

The following techniques, methods and tools were used to review all thesmart contracts.

## Static Analysis

Static Analysis of Smart Contracts was done to identify contract vulnerabilities. In this step a series of automated tools are used to testsecurity of smart contracts.

## Code Review / Manual Analysis

Manual Analysis or review of code was done to identify new vulnerability or verify the vulnerabilities found during the static analysis.Contracts were completely manually analyzed, their logic was checkedand compared with the one described in the whitepaper. Besides, the results of automated analysis were manually verified.

# ISSUE CATEGORIES

Every issue in this report has been assigned with a severity level. There are four levels of severity and each of them has been explained below.

## ➢ HIGH SEVERITY ISSUES

A high severity issue or vulnerability means that your smart contract can be exploited. Issues on this level are critical to the smart contract's performance or functionality and we recommend these issues to be fixed before movingto a live environment.

## ➢ MEDIUM SEVERITY ISSUES

The issues marked as medium severity usually arise because of errors and deficiencies in the smart contract code. Issues on this level could potentially bring problems and they should still be fixed.

## ➢ LOW SEVERITY ISSUES

Low level severity issues can cause minor impact and or are just warningsthat can remain unfixed for now. It would be better to fix these issues atsome point in the future.

## ➢ INFORMATIONAL

These are severity four issues which indicate an improvement request, ageneral question, a cosmetic or documentation error, or a request for information. There is low-to-no impact.

# ISSUES TABLE

| TYPE | HIGH | MEDIUM | LOW | INFORMATIONAL |
|---|---|---|---|---|
| OPEN | 0 | 0 | 1 | 0 |
| ACKNOWLWDGENT | - | - | - | - |
| CLOSED | - | - | - | - |

# INTRODUCTION

On 15-11-2023 – Astrobiatech Blockchain Security Team performed security audit for Mentalmatics smart contract.

| | |
|---|---|
| CONTRACT NAME | Mentalmatics |
| CONTRACT ADDRESS | 0x875F5F5A7c8823059E4D2Bd8A8B35a180c2E0e8e |
| BLOCKCHAIN | Binance Smart Chain |

# OVERVIEW

CONTRACT ADDRESS
0x875F5F5A7c8823059E4D2Bd8A8B35a180c2E0e8e

CONTRACT NAME
MMTToken

CONTRACT CREATOR
0x0cB116eD7c3F4Ecc922B1C95B111e3d0Df53bE7b

OWNER ADDRESS
0x0cB116eD7c3F4Ecc922B1C95B111e3d0Df53bE7b

SOURCE CODE
Contract Source Code Verified at Binance Smart Chain

OTHER SETTINGS
default evmVersion, MIT license

COMPILER VERSION
v0.4.24+commit.e67f0147

OPTIMIZATION ENABLED
No with 200 runs

Code is truncated to fit the constraints of this document.
https://bscscan.com/token/0x875f5f5a7c8823059e4d2bd8a8b35a180c2e0e8e#code

# MANUAL ANALYSIS FINDINGS

## LOW

### 1. Use of Older Solidity Version

**Description:-**

The provided Solidity code is written using Solidity version 0.4.24, an older version of the language. Solidity has undergone significant improvements and updates since then, introducing new features, optimizations, and security enhancements in later versions.

**Recommendation:-**

The codebase could benefit from migrating to a more recent and secure version of Solidity, such as version 0.8.0.

# AUTOMATED ANALYSIS

```
INFO:Detectors:
 Contract locking ether found:
        Contract MMTToken (token.sol#79-193) has payable functions:
         - MMTToken.fallback() (token.sol#189-191)
        But does not have a function to withdraw the ether
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#contracts-that-lock-ether
```

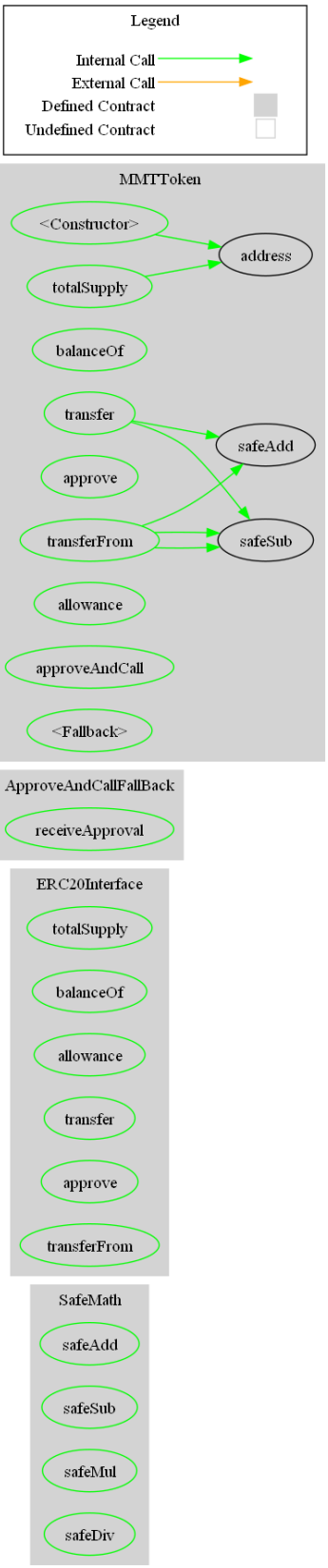
# FUNCTIONAL ANALYSIS

| Contract | Type | Bases | | |
|:---|:---|:---|:---|:---|
| └ | **Function Name** | **Visibility** | **Mutability** | **Modifiers** |
| **SafeMath** | Implementation | | | |
| └ | safeAdd | Public ! | NO ! | |
| └ | safeSub | Public ! | NO ! | |
| └ | safeMul | Public ! | NO ! | |
| └ | safeDiv | Public ! | NO ! | |
| **ERC20Interface** | Implementation | | | |
| └ | totalSupply | Public ! | NO ! | |
| └ | balanceOf | Public ! | NO ! | |
| └ | allowance | Public ! | NO ! | |
| └ | transfer | Public ! | 🛑 NO ! | |
| └ | approve | Public ! | 🛑 NO ! | |
| └ | transferFrom | Public ! | 🛑 NO ! | |
| **ApproveAndCallFallBack** | Implementation | | | |
| └ | receiveApproval | Public ! | 🛑 NO ! | |
| **MMTToken** | Implementation | ERC20Interface, SafeMath | | |
| └ | <Constructor> | Public ! | 🛑 NO ! | |
| └ | totalSupply | Public ! | NO ! | |
| └ | balanceOf | Public ! | NO ! | |
| └ | transfer | Public ! | 🛑 NO ! | |
| └ | approve | Public ! | 🛑 NO ! | |
| └ | transferFrom | Public ! | 🛑 NO ! | |
| └ | allowance | Public ! | NO ! | |
| └ | approveAndCall | Public ! | 🛑 NO ! | |
| └ | <Fallback> | Public ! | 💵 NO ! | |

### Legend

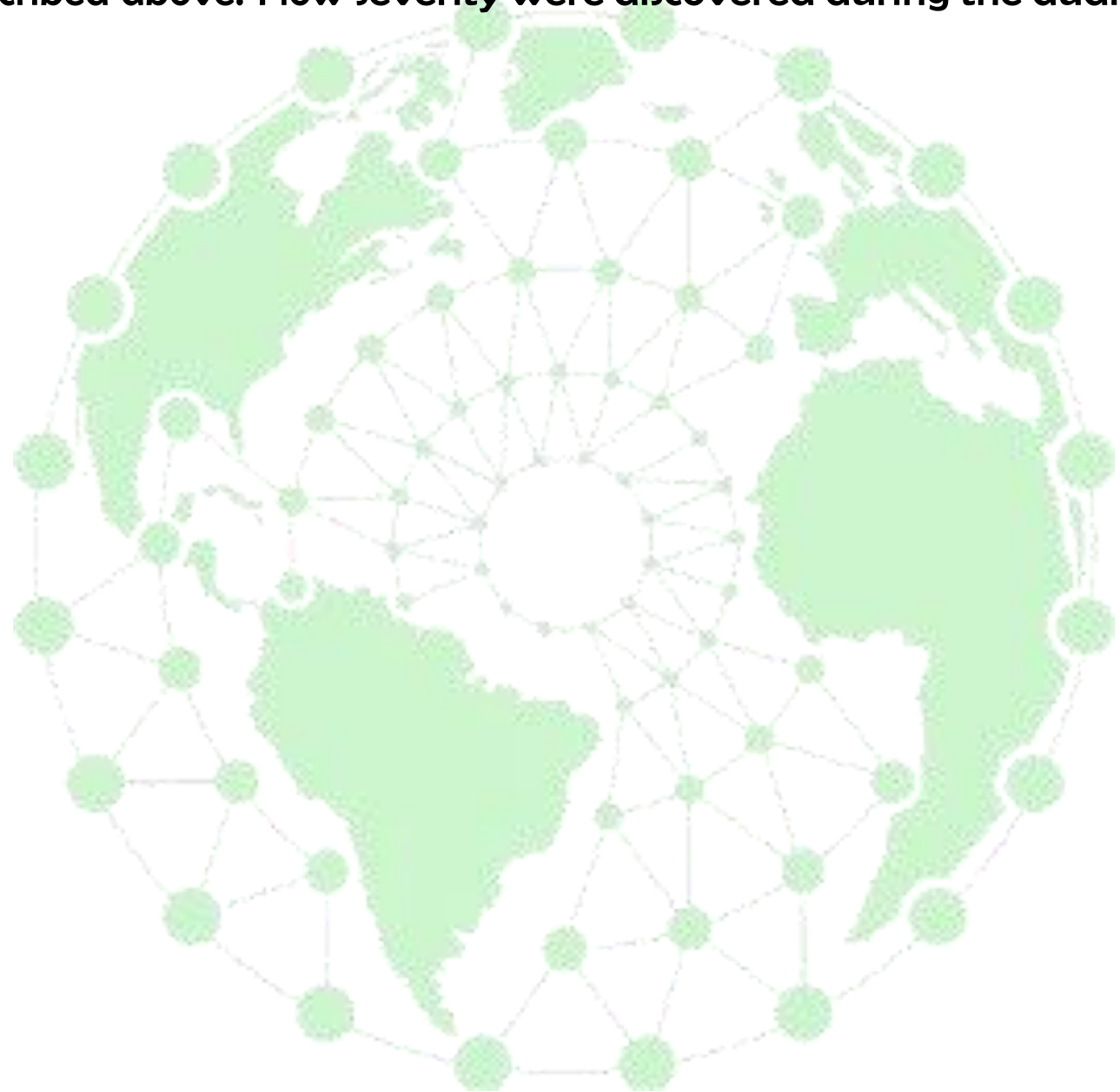
| Symbol | Meaning |
|:---|:---|
| 🛑 | Function can modify state |
| 💵 | Function is payable |

# GRAPH TREE



# SUMMARY

In this report, we have considered the security of the Mentalmatics smart contract. We performed our audit according to the procedure described above. 1 low severity were discovered during the audit.



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