HackSafe

# Smart Contract Security Audit Report

## Purple Monster Token

November 2022

Security Status

★★★⯪☆

www.hacksafe.io

# Audit Details

**Audited project**
Purple Monster Token

**Deployer address**
0x9ff3f268c5e0756eae1e2843522d2ff5793bcb2f

**Client contacts**
Purple Monster Token Team

**Blockchain**
Binance smart chain

**Website**
Not provided

# Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

# Procedure

### Step 1 - In-Depth Manual Review

Manual line-by-line code reviews to ensure the logic behind each function is sound and safe from various attack vectors. This is the most important and lengthy portion of the audit process (as automated tools often cannot find the nuances that lead to exploits such as flash loan attacks).

### Step 2 - Automated Testing

Simulation of a variety of interactions with your Smart Contract on a test blockchain leveraging a combination of automated test tools and manual testing to determine if any security vulnerabilities exist.

### Step 3 – Leadership Review

The engineers assigned to the audit will schedule meetings with our leadership team to review the contracts, any comments or findings, and ask questions to further apply adversarial thinking to discuss less common attack vectors.

### Step 4 - Resolution of Issues

Consulting with the team to provide our recommendations to ensure the code's security and optimize its gas efficiency, if possible. We assist project team's in resolving any outstanding issues or implementing our recommendations.

### Step 5 - Published Audit Report

Boiling down results and findings into an easy-to-read report tailored to the project. Our audit reports highlight resolved issues and any risks that exist to the project or its users, along with any remaining suggested remediation measures. Diagrams are included at the end of each report to help users understand the interactions which occur within the project.

# Background

**HackSafe was commissioned by Purple Monster Token to perform an audit of smart contracts:**

- https://bscscan.com/token/0xC46889ec6d0DeAffbfF6545621F82a3e6e0D73A5#code

**The purpose of the audit was to achieve the following:**

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

# Contract Details

## Token contract details for 21.11.2022

| | |
|---|---|
| Token Type | : DEFI |
| Contract name | : PurpleMonsterToken |
| Contract address | : 0xC46889ec6d0DeAffbfF6545621F82a3e6e0D73A5 |
| Total supply | : 6,307,277.477097 |
| Token Ticker | : PMOT |
| Decimals | : 18 |
| Token Holders | : 1,420 |
| Transactions count | : 39,685 |
| Compiler version | : v0.8.0+commit.c7dfd78e |
| Contract deployer address | : 0x9ff3f268c5e0756eae1e2843522d2ff5793bcb2f |
| Owner address | : 0xd66c5c66cef05a0fd2f20d087d4dad3fb48e10be |

# Audit Summary

According to the standard audit assessment, Customer`s solidity smart contracts are **"Poor Secure".** This token contract does contain owner control, which do not make it fully decentralized as owner does have control over smart contract.

| Insecure | Poor secured | Secure | Well-secured |
|---|---|---|---|

You are here

We used various tools like Slither, Mythril and Remix IDE. At the same time this finding is based on critical analysis of the manual audit. All issues found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the issues checking status.

We found 0 critical, 1 high,  medium and 1 low.

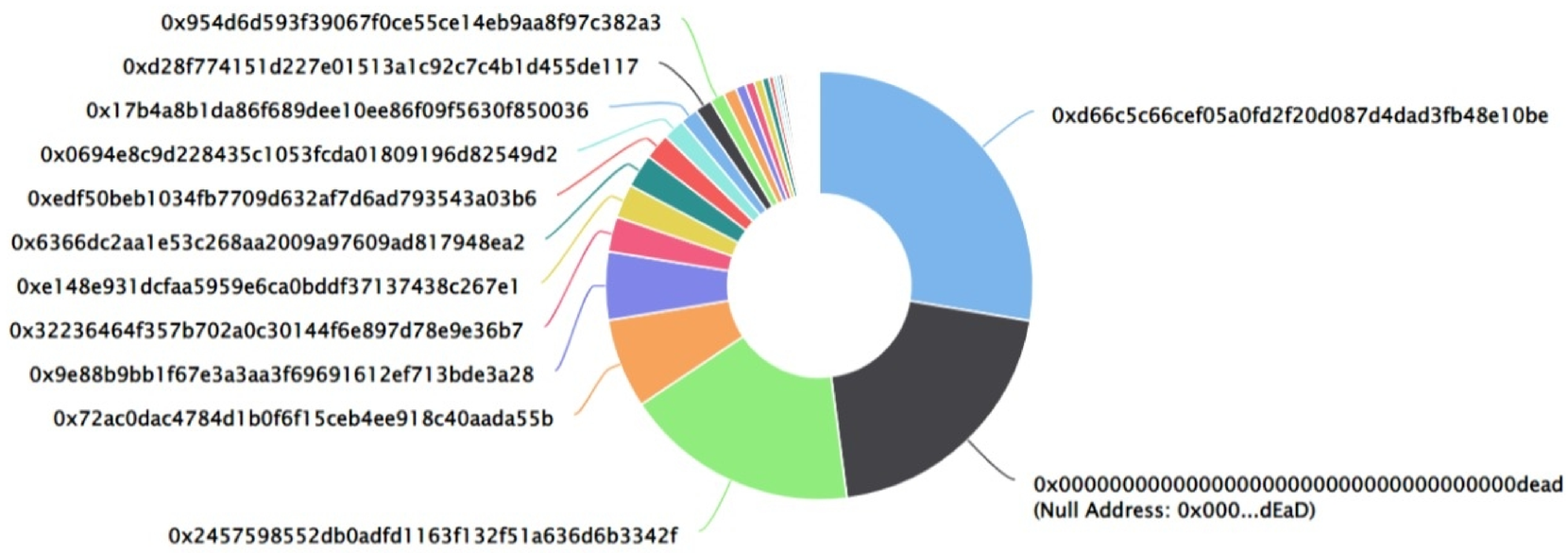
# Purple Monster Token Distribution

The top 100 holders collectively own 99.88% (6,299,979.86 Tokens) of Purple Monster Token

Token Total Supply: 6,307,277.48 Token | Total Token Holders: 1,420

Purple Monster Token Top 100 Token Holders

Source: BscScan.com



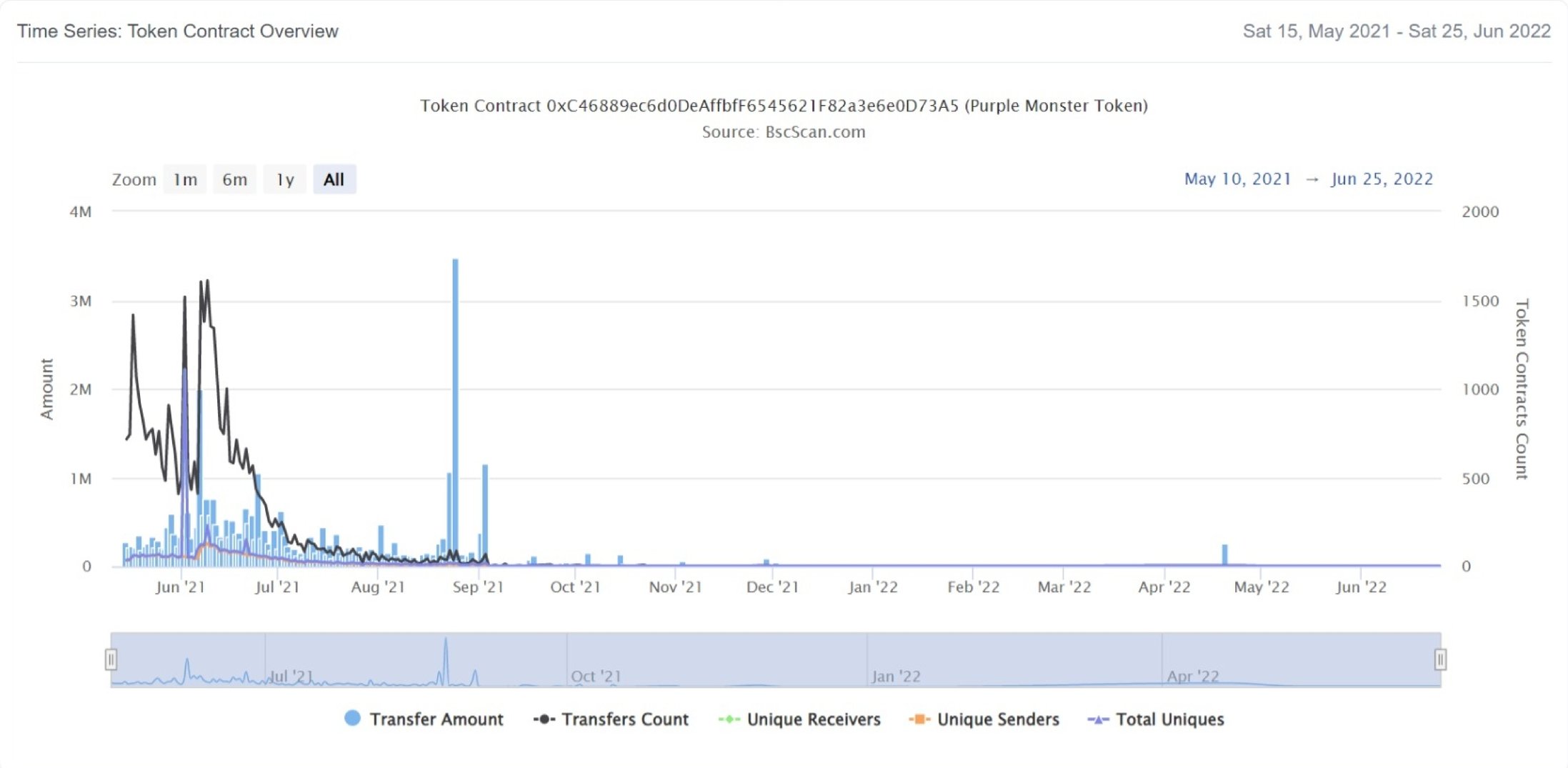

## Purple Monster Token Top 20 Token Holders

(A total of 6,299,979.86 tokens held by the top 100 accounts from the total supply of 6,307,277.48 token)

| Rank | Address | Quantity (Token) | Percentage |
|---|---|---|---|
| 1 | 0xd66c5c66cef05a0fd2f20d087d4dad3fb48e10be | 1,744,013.458760679510871279 | 27.6508% |
| 2 | Null Address: 0x000...dEaD | 1,279,538.459725439072427902 | 20.2867% |
| 3 | 0x2457598552db0adfd1163f132f51a636d6b3342f | 1,116,800.844952211901366193 | 17.7065% |
| 4 | 0x72ac0dac4784d1b0f6f15ceb4ee918c40aada55b | 425,857.005085452529528671 | 6.7518% |
| 5 | 0x9e88b9bb1f67e3a3aa3f69691612ef713bde3a28 | 324,845.673825343605670068 | 5.1503% |
| 6 | 0x32236464f357b702a0c30144f6e897d78e9e36b7 | 167,001.094084801936332159 | 2.6478% |
| 7 | 0xe148e931dcfaa5959e6ca0bddf37137438c267e1 | 162,012.456259802480461447 | 2.5687% |
| 8 | 0x6366dc2aa1e53c268aa2009a97609ad817948ea2 | 159,205.018989972026697071 | 2.5241% |
| 9 | 0xedf50beb1034fb7709d632af7d6ad793543a03b6 | 123,184.629638073033475579 | 1.9531% |
| 10 | 0x0694e8c9d228435c1053fcda01809196d82549d2 | 103,852.925301299043310028 | 1.6466% |
| 11 | 0x17b4a8b1da86f689dee10ee86f09f5630f850036 | 84,847.937907484753009969 | 1.3452% |
| 12 | 0xd28f774151d227e01513a1c92c7c4b1d455de117 | 81,589.914214100679081873 | 1.2936% |
| 13 | 0x954d6d593f39067f0ce55ce14eb9aa8f97c382a3 | 68,451.041580251085734359 | 1.0853% |
| 14 | 0x7c9345431ee7a6d0158db140bfbba216bf18ddb7 | 63,259.066961997877435994 | 1.0030% |
| 15 | 0x6a6ec8b29fd987c830ba626a12a38fb3830e2ef3 | 48,399.334934653185411751 | 0.7674% |
| 16 | 0xe7cebe67c6f750dd87ae8007e82fc457dc0f1c45 | 42,812.592279922120435986 | 0.6788% |
| 17 | 0x8d62c1f9a0b8ffcfb8927b5c6cbe3971a666cae2 | 39,215.566785514457305336 | 0.6218% |
| 18 | 0xcdd26545a5ebf4e46bf3a11d5ece80a96d4d0032 | 33,000.014591546666301878 | 0.5232% |
| 19 | 0xe396d9e22674783814997df0729c00c93f9dd14d | 20,689.22181135999579912 | 0.3280% |
| 20 | 0xa24bd512d81ab7a949267f14e3085702f2848931 | 16,347.719288481919140444 | 0.2592% |

# Purple Monster Token Distribution

## Purple Monster Token Contract Overview



# Contract functions details

BEP20.sol
+BEP20 (Context, IBEP20, Ownable)
- <constructor>
- [Ext] getOwner
- [Pub] name
- [Pub] symbol
- [Pub] decimals
- [Pub] totalSupply
- [Pub] balanceOf
- [Pub] transfer #
- [Pub] allowance
- [Pub] approve #
- [Pub] transferFrom #
- [Pub] increaseAllowance #
- [Pub] decreaseAllowance #
- [Pub] mint #
  - modifier onlyOwner
- [Int] _transfer #
- [Int] _mint #
- [Int] _burn #
- [Int] _approve #
- [Int] _burnFrom #

IBEP20.sol
+ [Int] IBEP20
- [Ext] totalSupply
- [Pub] decimals
- [Pub] symbol
- [Pub] name
- [Pub] getOwner
- [Ext] balanceOf
- [Ext] transfer
- [Ext] allowance
- [Ext] approve
- [Ext] transferFrom

purplemonstertoken.sol
+PurpleMonsterToken (BEP20)
- [Pub] mint #

# Contract functions details

-modifier onlyOwner

Ownable.sol
+ Ownable (Context)
-[Pub] <constructor>#
-[Pub] owner
-[Pub] renounceOwnership #
- modifiers: onlyOwner
-[Pub] transferOwnership #
- modifiers: onlyOwner

Context.sol
+ Context
-[Int] _msgSender
-[Int] _msgData

SafeMath.sol
+ [Lib] SafeMath
-[Int] tryAdd
-[Int] trySub
-[Int] tryMul
-[Int] tryDiv
-[Int] tryMod
-[Int] add
-[Int] sub
-[Int] mul
-[Int] div
-[Int] mod
-[Int] sub
-[Int] div
-[Int] mod

($) = payable function
# = non-constant function

# Issues Checking Status

| No. | Title | Status |
|---|---|---|
| 1. | Unlocked Compiler Version | Low issue |
| 2. | Missing Input Validation | Passed |
| 3. | Race conditions and Reentrancy. Cross-function race conditions. | Passed |
| 4. | Possible delays in data delivery | Passed |
| 5. | Oracle calls. | Passed |
| 6. | Timestamp dependence. | Passed |
| 7. | Integer Overflow and Underflow | Passed |
| 8. | DoS with Revert. | Passed |
| 9. | DoS with block gas limit. | Passed |
| 10. | Methods execution permissions. | Passed |
| 11. | Economy model of the contract. | Passed |
| 12. | Private use data leaks. | Passed |
| 13. | Malicious Event log. | Passed |
| 14. | Scoping and Declarations. | Passed |
| 15. | Uninitialized storage pointers. | Passed |
| 16. | Arithmetic accuracy. | Passed |
| 17. | Design Logic. | Passed |
| 18. | Safe Open Zeppelin contracts implementation and usage. | High issue |
| 19. | Incorrect Naming State Variable | Passed |
| 20. | Too old version | Passed |

# Severity Definitions

| Risk Level | Description |
|---|---|
| Critical | Critical vulnerabilities are usually straightforward to exploit and can lead to assets loss or data manipulations. |
| High | High-level vulnerabilities are difficult to exploit; however, they also have a significant impact on smart contract execution, e.g., public access to crucial functions |
| Medium | Medium-level vulnerabilities are important to fix; however, they can't lead to assets loss or data manipulations. |
| Low | Low-level vulnerabilities are mostly related to outdated, unused, etc. code snippets that can't have a significant impact on execution. |

# Security Issues

### Critical Severity Issues

No critical severity issue found.

### High Severity Issues

One high severity issue found.

### 1. Safe Open Zeppelin contracts implementation and usage:

- **Description**

  The contract file BEP20.sol and purplemonstertoken.sol have direct imported openzepplin contract files any changes in that file can affect these contracts too.

- **Recommendation**

  It is advisable to not direct import any contracts files form github repository.

### Medium Severity Issues

No medium severity issue found.

### Low Severity Issues

One low severity issue found.

### 1. Unlocked Compiler Version.

- **Description**

  The contract utilizes an unlocked compiler version. An unlocked compiler version in the contract's source code permits the user to compile it at or above a particular version. This, in turn, leads to differences in the generated bytecode between compilations due to differing compiler version numbers. This can lead to ambiguity when debugging as compiler-specific bugs may occur in the codebase that would be difficult to identify over a span of multiple compiler versions rather than a specific one.

- **Recommendation**

  It is advisable that the compiler version is alternatively locked at the lowest version possible so that the contract can be compiled. For example, for version >= 0.8.0 the contract should contain the following line:

```
pragma solidity 0.8.0;
```

# Centralization

## Owner Privileges :

- Purple Monster Token Contract:
    - Owner can transfer and renounce ownership.
    - Owner can mint.

This smart contract has some functions which can be executed by the admin (Owner) only. If the admin wallet private key would be compromised, then it would create trouble as smart contract ownership has not been renounced. Following are Admin functions:

- transferOwnership
- renounceOwnership
- mint

# Conclusion

Smart contract contains low and high severity issues! The further transfer and operations with the fund raised are not related to this particular contract.

HackSafe note: Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.