

**HACKEN**

# SMART CONTRACT CODE REVIEW AND SECURITY ANALYSIS REPORT

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Customer: Multigame

Date: August 28<sup>th</sup>, 2021



This document may contain confidential information about IT systems and the intellectual property of the Customer as well as information about potential vulnerabilities and methods of their exploitation.

The report containing confidential information can be used internally by the Customer, or it can be disclosed publicly after all vulnerabilities fixed – upon a decision of the Customer.

## Document

<b>Name</b>	Smart Contract Code Review and Security Analysis Report for Multigame.
<b>Approved by</b>	Andrew Matiukhin   CTO Hacken OU
<b>Type</b>	Token, Staking
<b>Platform</b>	Ethereum / Solidity
<b>Methods</b>	Architecture Review, Functional Testing, Computer-Aided Verification, Manual Review
<b>Repository</b>	<a href="https://github.com/multigameorg/audit/blob/main/MultigameToken.sol">https://github.com/multigameorg/audit/blob/main/MultigameToken.sol</a>
<b>Commit</b>	4f89b8e190be221df421451c67322700ee4e9723
<b>Technical Documentation</b>	NO
<b>JS tests</b>	NO
<b>Timeline</b>	23 AUG 2021 - 28 AUG 2021
<b>Changelog</b>	26 AUG 2021 - INITIAL AUDIT 28 AUG 2021 - SECOND REVIEW



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## Introduction

Hacken OÜ (Consultant) was contracted by Multigame (Customer) to conduct a Smart Contract Code Review and Security Analysis. This report presents the findings of the security assessment of Customer's smart contract and its code review conducted between August 23<sup>rd</sup>, 2021 - August 26<sup>th</sup>, 2021. The second review conducted on August 28<sup>th</sup>, 2021.

## Scope

The scope of the project is smart contracts in the repository:

**Repository:**

<https://github.com/multigameorg/audit/blob/main/MultigameToken.sol>

**Commit:**

4f89b8e190be221df421451c67322700ee4e9723

**Technical Documentation:** No

**JS tests:** No

**Contracts:**

[MultigameToken.sol](#)

We have scanned this smart contract for commonly known and more specific vulnerabilities. Here are some of the commonly known vulnerabilities that are considered:

Category	Check Item
Code review	<ul style="list-style-type: none"><li>▪ Reentrancy</li><li>▪ Ownership Takeover</li><li>▪ Timestamp Dependence</li><li>▪ Gas Limit and Loops</li><li>▪ DoS with (Unexpected) Throw</li><li>▪ DoS with Block Gas Limit</li><li>▪ Transaction-Ordering Dependence</li><li>▪ Style guide violation</li><li>▪ Costly Loop</li><li>▪ ERC20 API violation</li><li>▪ Unchecked external call</li><li>▪ Unchecked math</li><li>▪ Unsafe type inference</li><li>▪ Implicit visibility level</li><li>▪ Deployment Consistency</li><li>▪ Repository Consistency</li><li>▪ Data Consistency</li></ul>

Functional review	<ul style="list-style-type: none"> <li>▪ Business Logics Review</li> <li>▪ Functionality Checks</li> <li>▪ Access Control &amp; Authorization</li> <li>▪ Escrow manipulation</li> <li>▪ Token Supply manipulation</li> <li>▪ Assets integrity</li> <li>▪ User Balances manipulation</li> <li>▪ Data Consistency manipulation</li> <li>▪ Kill-Switch Mechanism</li> <li>▪ Operation Trails &amp; Event Generation</li> </ul>
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## Executive Summary

According to the assessment, the Customer's smart contracts are well-secured.



You are here 

Our team performed an analysis of code functionality, manual audit, and automated checks with Mythril and Slither. All issues found during automated analysis were manually reviewed, and important vulnerabilities are presented in the Audit overview section. All found issues can be found in the Audit overview section.

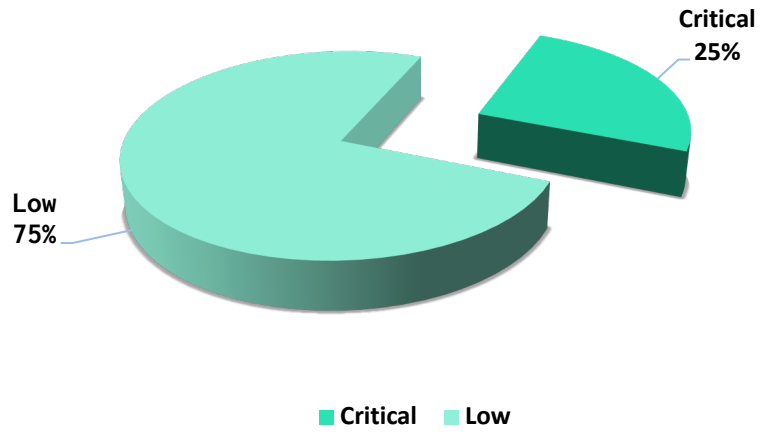
As a result of the audit, the security engineers found 1 critical and 3 low severity issues.

After the second review the security engineers found no issues.

**Notice:**

The claimBox function uses the NFTLootbox contract for minting boxes. The NFTLootbox contract is outside the scope of this audit, and we cannot be sure that the mint function is properly restricted. In a worst-case scenario, anyone can mint boxes and they have no value.

**Graph 1. The distribution of vulnerabilities after the audit.**





## Severity Definitions

Risk Level	Description
<b>Critical</b>	Critical vulnerabilities are usually straightforward to exploit and can lead to assets loss or data manipulations.
<b>High</b>	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
<b>Medium</b>	Medium-level vulnerabilities are important to fix; however, they can't lead to assets loss or data manipulations.
<b>Low</b>	Low-level vulnerabilities are mostly related to outdated, unused, etc. code snippets that can't have a significant impact on execution

## Audit overview

### ■ ■ ■ ■ Critical

The transferFrom function does not have a whitelist check and can be used to bypass the whitelist.

**Function:** transferFrom

**Recommendation:** add check for whitelist

**Status:** Not an issue after a Customer comment

**Customer comment:** *Check whitelist which can buy tokens in the first minutes after listed on PancakeSwap for anti bot. Only use on transfer because PancakeSwap use transfer function on token swap from BNB to MULTI. Do not check transferFrom for listing PancakeSwap to allow add liquidity on PancakeSwap.*

### ■ ■ ■ High

No high severity issues were found.

### ■ ■ Medium

No medium severity issues were found.

### ■ Low

1. The '+=' operation is redundant, just '='.

**Function:** updatePoint, line 140

**Recommendation:** change.

**Status:** fixed before the second review.

2. Commented code is bad code style.

**Function:** swapAndLiquify, line 212

**Recommendation:** remove unused code.

**Status:** fixed before the second review.

3. Lots of confusing comments in the code. About BNB and pancakeswap, but the contract uses ETH and uniswap.

**Recommendation:** remove or change misleading comments.

**Status:** fixed before the second review.





## Conclusion

Smart contracts within the scope were manually reviewed and analyzed with static analysis tools.

Audit report contains all found security vulnerabilities and other issues in the reviewed code.

As a result of the audit, the security engineers found **1** critical and **3** low severity issues.

After the second review the security engineers found no issues.

### **Notice:**

The claimBox function uses the NFTLootbox contract for minting boxes. The NFTLootbox contract is outside the scope of this audit, and we cannot be sure that the mint function is properly restricted. In a worst-case scenario, anyone can mint boxes and they have no value.



## Disclaimers

### **Hacken Disclaimer**

The smart contracts given for audit have been analyzed in accordance with the best industry practices at the date of this report, in relation to cybersecurity vulnerabilities and issues in smart contract source code, the details of which are disclosed in this report (Source Code); the Source Code compilation, deployment, and functionality (performing the intended functions).

The audit makes no statements or warranties on the security of the code. It also cannot be considered as a sufficient assessment regarding the utility and safety of the code, bugfree status, or any other statements of the contract. While we have done our best in conducting the analysis and producing this report, it is important to note that you should not rely on this report only – we recommend proceeding with several independent audits and a public bug bounty program to ensure the security of smart contracts.

### **Technical Disclaimer**

Smart contracts are deployed and executed on a blockchain platform. The platform, its programming language, and other software related to the smart contract can have vulnerabilities that can lead to hacks. Thus, the audit can't guarantee the explicit security of the audited smart contracts.