

SMART CONTRACT CODE REVIEW AND SECURITY ANALYSIS REPORT



Customer: Champion Games SL
Date: December 10th, 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 are fixed — upon a decision of the Customer.

Document

Name	Smart Contract Code Review and Security Analysis Report for Champion Games SL.		
Approved by	Andrew Matiukhin CTO Hacken OU		
Туре	Market Maker		
Platform	Polygon / Solidity		
Methods	Architecture Review, Functional Testing, Computer-Aided Verification, Manual Review		
Repository	https://github.com/metasoccer/TokenBondingCurve		
Commit	3094237f17550ef2c4894616ac0e16f9121f1af3		
Technical	YES		
Documentation			
JS tests	YES		
Website	metasoccer.com		
Timeline	24 NOVEMBER 2021 - 10 DECEMBER 2021		
Changelog	30 NOVEMBER 2021 - INITIAL AUDIT 10 DECEMBER 2021 - SECOND REVIEW		

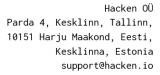




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Introduction

Hacken OÜ (Consultant) was contracted by Champion Games SL (Customer) to conduct a Smart Contract Code Review and Security Analysis. This report presents the findings of the security assessment of the Customer's smart contract and its code review conducted between November $24^{\rm th}$, 2021 - November $30^{\rm th}$, 2021.

Second review conducted on December 10th, 2021.

Scope

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

Repository:

https://github.com/metasoccer/TokenBondingCurve

Commit:

3094237f17550ef2c4894616ac0e16f9121f1af3

Technical Documentation: Yes (
https://drive.google.com/file/d/1dvWRGyoBiL_YyF2r_x5GJ4ek1Ump-fq5/view)

JS tests: Yes (included)

Contracts:

bancor-formula/interfaces/IBancorFormula.sol
bancor-formula/utils/Utils.sol
bancor-formula/BancorFormula.sol
BatchedBancorMarketMaker.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	Reentrancy
	Ownership Takeover
	Timestamp Dependence
	Gas Limit and Loops
	DoS with (Unexpected) Throw
	DoS with Block Gas Limit
	 Transaction-Ordering Dependence
	Style guide violation
	Costly Loop
	ERC20 API violation
	Unchecked external call
	Unchecked math
	Unsafe type inference
	Implicit visibility level
	Deployment Consistency
	Repository Consistency
	Data Consistency



Functional	review

- Business Logics Review
- Functionality Checks
- Access Control & Authorization
- Escrow manipulation
- Token Supply manipulation
- Assets integrity
- User Balances manipulation
- Data Consistency manipulation
- Kill-Switch Mechanism
- Operation Trails & Event Generation

Executive Summary

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

Insecure	Poor secured	Secured	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, security engineers found 1 low severity issue.

After the second review security engineers found no security issues.



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	



Audit overview

Critical

No critical issues were found.

High

No high severity issues were found.

■ ■ Medium

No medium severity issues were found.

Low

A public function that could be declared external.

public functions that are never called by the contract should be
declared external to save gas

Contracts: BatchedBancorMarketMaker.sol

Function: getCollateralPricePPM, getBatch, getCollateralToken, getCurrentBatchId

Recommendation: Use the **external** attribute for functions never called from the contract.

Status: Fixed



Conclusion

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

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

As a result of the audit, security engineers found 1 low severity issue.

After the second review security engineers found no security issues.



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, bug-free 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.