HACKEN

SMART CONTRACT CODE REVIEW AND SECURITY ANALYSIS REPORT

Customer: Dehive
Date: August 17th, 2021

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Document

Name	Smart Contract Code Review and Security Analysis Report for Dehive.
Approved by	Andrew Matiukhin | CTO Hacken OU
Type	ERC20 token; Staking;
Platform	Ethereum / Solidity
Methods	Architecture Review, Functional Testing, Computer-Aided Verification, Manual Review
Repository	
Commit	
Deployed contract	
Technical Documentation	No
JS tests	Yes
Changelog	06 August 2021 - Initial Audit 17 August 2021 - second review

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Introduction

Hacken OÜ (Consultant) was contracted by Client (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 on August 06th, 2021.

Second review conducted on August 17th, 2021.

Scope

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

Repository:
Commit:
Technical Documentation: No
JS tests: Yes
Contracts:
contracts/ClusterToken.sol
contracts/Controller.sol
contracts/StakingDHV.sol
contracts/dex-adapter/DexAdapterCore.sol
contracts/dex-adapter/mainnet/UniswapAdapter.sol
contracts/dex-adapter/polygon/QickswapAdapter.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

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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 secure.

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** high, **3** medium and **1** low severity issue.

As a result of the second review, the code contains no issues.

Notice:

1. No technical and functional description is provided by the Customer. We may not guarantee correctness of calculations used in the code.
2. Audit scope is limited to files from the scope section of the report. We may not guarantee secureness of all other contracts.

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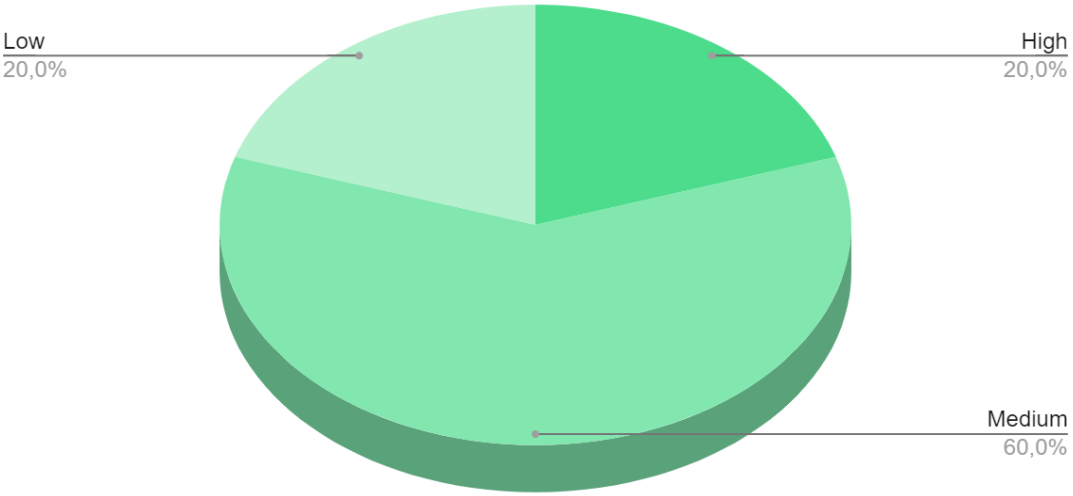
Graph 1. The distribution of vulnerabilities after the audit.



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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

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Audit overview

Critical

No critical issues were found.

High

1. Value of the `denominator` variable depends on the underlying tokens price to ETH and is used to calculate an amount of tokens that will be minted. Underlying tokens price can be manipulated using flash loans. As a result, `denominator` value can be low and an attacker can receive an enormous amount of tokens. Those tokens can be used to dump the token course on DEXes, to pay out flash loans, and earn funds.

   The issue is hardly exploitable and requires multiple market conditions to match.

   Contracts: ClusterToken.sol

   Function: assemble

   Recommendation: protect the contract from flashloan attacks.

   Status: Fixed

Medium

1. Sending `dust` back to a message caller consumes more gas than will actually be sent.

   Contracts: ClusterToken.sol

   Function: assemble

   Recommendation: do not send funds if transfer takes more gas than will be actually sent.

   Status: Fixed

Low

1. Rewards calculation logic is duplicated all over the code.

   Contracts: StakingDHV.sol

   Recommendation: avoid code duplications, move common logic to separate functions.

   Status: Fixed

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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, security engineers found **1** high, **3** medium and **1** low severity issue.

As a result of the second review, the code contains **no** issues.

Notice:

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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.