CERTIK

Security Assessment

Copuppy III

Nov 11th, 2021

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Summary

This report has been prepared for Copuppy III to discover issues and vulnerabilities in the source code of the Copuppy III project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

Overview

Project Summary

Project Name	Copuppy III
Platform	ethereum
Language	Solidity
Codebase	https://github.com/copuppy/dawnwars
Commit	bc89f73336a899970530d53ddc8cedc6363d438b

Audit Summary

Delivery Date	Nov 11, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	

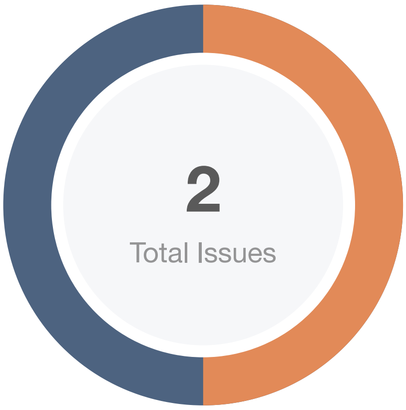
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Partially Resolved	Resolved
Critical	0	0	0	0	0	0
Major	1	0	0	1	0	0
Medium	0	0	0	0	0	0
Minor	0	0	0	0	0	0
Informational	1	0	0	1	0	0
Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
DWC	DWCharacter.sol	29e52fc1b289daa6406f430b399d06b420f64d391e429e9ee8bb7b20b4a6d7d8

Findings



Critical	**0** (0.00%)
Major	**1** (50.00%)
Medium	**0** (0.00%)
Minor	**0** (0.00%)
Informational	**1** (50.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
Copuppy-01	Unlocked Compiler Version	Language Specific	Informational	ⓘ Acknowledged
DWC-01	Centralization Risk	**Centralization / Privilege**	**Major**	ⓘ Acknowledged

Copuppy-01 | Unlocked Compiler Version

Category	Severity	Location	Status
Language Specific	Informational	Global	Acknowledged

Description

The contract has 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 an ambiguity when debugging as compiler specific bugs may occur in the codebase that would be hard to identify over a span of multiple compiler versions rather than a specific one.

Recommendation

"We advise that the compiler version is instead locked at the lowest version possible that the contract can be compiled at. For example, for version `v0.8.0` the contract should contain the following line:

````
pragma solidity 0.8.0;
```"
````

Alleviation

Copuppy team acknowledged this finding. The team will use hardhat to deploy and lock the compiler version in hardhat.
````

DWC-01 | Centralization Risk

Category	Severity	Location	Status
Centralization / Privilege	**Major**	DWCharacter.sol: 1953	Acknowledged

Description

In the contract `Character`, the role `owner` or `minter` have the authority over the following function:

- [burnByOwner] Burn the token with the `tokenId`.
- [mint] Mint the token to anyone.
- [pause] and [unpause] Modify the suspended state variable, which determines whether the `transfer` can be made.

Any compromise to the `owner` account may allow the hacker to take advantage of this.

Recommendation

We advise the client to carefully manage the `owner` account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol to be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., Multisignature wallets.

Indicatively, here is some feasible suggestions that would also mitigate the potential risk at the different level in term of short-term and long-term:

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key;
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.

Alleviation

Copuppy team acknowledged this finding, and they may use DAO in the future.

Appendix

Finding Categories

Centralization / Privilege

Centralization / Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

Language Specific

Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of private or delete.

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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