



Code Security Assessment

Samurai Battle

Jan 18th, 2022

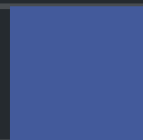


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Disclaimer

About

Summary

This report has been prepared for Samurai Battle to discover issues and vulnerabilities in the source code of the Samurai Battle 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	Samurai Battle
Platform	other
Language	Solidity
Codebase	https://github.com/dunghoang74/SBM/blob/main/SMB_token.sol
Commit	a42a4a9b9655b438546edf4456ed3e62f067bb74

Audit Summary

Delivery Date	Jan 18, 2022
Audit Methodology	Static Analysis, Manual Review

Vulnerability Summary

Vulnerability Level	Total	⚠ Pending	⊗ Declined	ℹ Acknowledged	🔄 Partially Resolved	✅ Resolved
🔴 Critical	0	0	0	0	0	0
🟠 Major	2	0	0	2	0	0
🟡 Medium	0	0	0	0	0	0
🟠 Minor	1	0	0	0	0	1
🟡 Informational	0	0	0	0	0	0
🟢 Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
SMB	SMB_token.sol	affc9fbff9a5ec13ecc19357ec4af0bdf8817ada1eda3c43e85006c08384df91

Findings



Critical	0 (0.00%)
Major	2 (66.67%)
Medium	0 (0.00%)
Minor	1 (33.33%)
Informational	0 (0.00%)
Discussion	0 (0.00%)

ID	Title	Category	Severity	Status
GLOBAL-01	Centralization Related Risks	Centralization / Privilege	● Major	ⓘ Acknowledged
SMB-01	Token Minted To Centralized Address	Centralization / Privilege	● Major	ⓘ Acknowledged
SMB-02	Missing Input Validation	Volatile Code	● Minor	✓ Resolved

GLOBAL-01 | Centralization Related Risks

Category	Severity	Location	Status
Centralization / Privilege	● Major	Global	ⓘ Acknowledged

Description

In the contract `Ownable`, the role `owner` has authority over the following functions:

- function `renounceOwnership()`
- function `transferOwnership()`
-

In the contract `SMB`, the role `owner` has authority over the following functions:

- function `setWhitelist()`
- function `setAntiWhale()`
- function `setMaxSell()`
- function `setMaxBuy()`
- function `setAntiWhaleTime()`
- function `setLiquidPair()`

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

Recommendation

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., multi-signature wallets.

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

Short Term:

Timelock and Multi sign ($\frac{2}{3}$, $\frac{3}{5}$) combination *mitigate* by delaying the sensitive operation and avoiding a single point of key management failure.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
AND
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key compromised;
AND
- A medium/blog link for sharing the timelock contract and multi-signers addresses information with the public audience.

Long Term:

Timelock and DAO, the combination, *mitigate* by applying decentralization and transparency.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
AND
- Introduction of a DAO/governance/voting module to increase transparency and user involvement;
AND
- A medium/blog link for sharing the timelock contract, multi-signers addresses, and DAO information with the public audience.

Permanent:

Renouncing the ownership or removing the function can be considered *fully resolved*.

- Renounce the ownership and never claim back the privileged roles;
OR
- Remove the risky functionality.

Alleviation

The client acknowledged.

SMB-01 | Token Minted To Centralized Address

Category	Severity	Location	Status
Centralization / Privilege	● Major	SMB_token.sol: 1006	📄 Acknowledged

Description

The amount of `_totalSupply` tokens that are minted to the centralized address `msg.sender` who is `owner`, may raise the community's concerns about the centralization issue.

Recommendation

We advise the client to carefully manage the `owner` account's private key and avoid any potential risks of being hacked. We also advise the client to adopt Multisig, Timelock, and/or DAO in the project to manage this specific account in this case.

Alleviation

The client acknowledged.

SMB-02 | Missing Input Validation

Category	Severity	Location	Status
Volatile Code	● Minor	SMB_token.sol: 1181~1182	✓ Resolved

Description

The given input is missing the check for inputs. The `_antiWhaleStart` should be smaller than `_antiWhaleEnd`.

Recommendation

We advise adding the check for the passed-in values to prevent unexpected error.

Alleviation

The client heeded our advice and changed related codes. Code change was applied in commit `42e17ca588fa95a706a6ba939fa21165a752b970`.

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.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

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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About

Founded in 2017 by leading academics in the field of Computer Science from both Yale and Columbia University, CertiK is a leading blockchain security company that serves to verify the security and correctness of smart contracts and blockchain-based protocols. Through the utilization of our world-class technical expertise, alongside our proprietary, innovative tech, we're able to support the success of our clients with best-in-class security, all whilst realizing our overarching vision; provable trust for all throughout all facets of blockchain.

