Security Assessment

Gomining

Aug 12th, 2021

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Summary

This report has been prepared for GOMINING PTE. LTD. to discover issues and vulnerabilities in the source code of the Gomining 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 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	Gomining
Platform	Ethereum
Language	Solidity
Codebase	https://etherscan.io/address/0x7ddc52c4de30e94be3a6a0a2b259b2850f421989#code
Commit	

Audit Summary

Delivery Date	Aug 12, 2021
Audit Methodology	Static Analysis
Key Components	

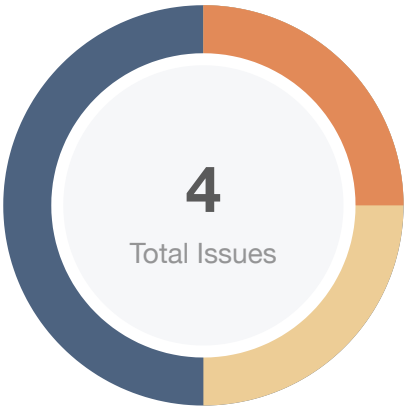
Vulnerability Summary

Vulnerability Level	Total	Pending	Partially Resolved	Resolved	Acknowledged	Declined
Critical	0	0	0	0	0	0
Major	1	0	0	1	0	0
Medium	0	0	0	0	0	0
Minor	1	0	0	0	1	0
Informational	2	0	0	0	2	0
Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
CGM	Context.sol	543c46d0f81fd4e5d9d6a92beef3d2be18badb483b0b4718c819fe3dbbc37587
GMT	GoMiningToken.sol	d099462f9bd3a7103edc5201f3710230ed1f1c6727abdd3a47ac78ea31c45e98
IER	IERC20.sol	5f4e89bc7ee8aeb26b724218151ebe2b5787f2c73b084d3e2b54ef5716223b18
IEC	IERC20Metadata.sol	1f9380710a5a86e156dc3c0feb20e432f75973345a58bee70121d8df89da7c2f
OGM	Ownable.sol	6fda585e8e9903204726fc7447a41a5b25e2f3c52b89a106b581cccb6e7c024e
PGM	Pausable.sol	1d08116ec31b3068802b764d44eeb45357b7b4cc56b96a336e25adad718cf828
SMG	SafeMath.sol	3bf9042f6d35f2cf0389fb8bef53b3ff29d60740a60e92d423798a62ec57cdc9

Findings



Critical	0 (0.00%)
Major	1 (25.00%)
Medium	0 (0.00%)
Minor	1 (25.00%)
Informational	2 (50.00%)
Discussion	0 (0.00%)

ID	Title	Category	Severity	Status
GMT-01	Initial token distribution	**Centralization / Privilege**	**Minor**	**Acknowledged**
GMT-02	Potential Risk On `approve`/`transferFrom` Methods	Gas Optimization	Informational	Acknowledged
GMT-03	Proper Usage of `public` and `external` Type	Gas Optimization	Informational	Acknowledged
GMT-04	Potential centralization risk	**Centralization / Privilege**	**Major**	**Resolved**

GMT-01 | Initial token distribution

Category	Severity	Location	Status
Centralization / Privilege	**Minor**	GoMiningToken.sol: 36	**Acknowledged**

Description

All of the $GMT tokens are sent to the contract deployer when deploying the contract.

Recommendation

We recommend the team to be transparent regarding the initial token distribution process.

Alleviation

N/A

GMT-02 | Potential Risk On `approve`/`transferFrom` Methods

Category	Severity	Location	Status
Gas Optimization	Informational	GoMiningToken.sol: 112~115, 130~138	Acknowledged

Description

These two methods in ERC20 could be used in an attack that allows a spender to transfer more tokens than the owner of the tokens ever wanted to allow the spender to transfer. Here is the reference link: https://docs.google.com/document/d/1YLPtQxZu1UAvO9cZ1O2RPXBbT0mooh4DYKjA_jp-RLM/edit#

Recommendation

Consider using `SafeERC20`.

Alleviation

GoMining team acknowledged this finding.

GMT-03 | Proper Usage of `public` and `external` Type

Category	Severity	Location	Status
Gas Optimization	Informational	GoMiningToken.sol: 42~44, 50~52, 67~69	Acknowledged

Description

`public` functions that are never called by the contract could be declared `external`.

Example: Functions `name()`, `symbol()` and `decimals()`.

Recommendation

Consider using the `external` attribute for functions never called from the contract.

Alleviation

GoMining team acknowledged this finding.

GMT-04 | Potential centralization risk

Category	Severity	Location	Status
Centralization / Privilege	**Major**	GoMiningToken.sol: 216~218, 240~242	**Resolved**

Description

Functions `mint` and `burn` are merely called by the owner, and they allow the caller to mint tokens to any specified recipient or burn tokens from any specified account. To improve the trustworthiness of this protocol, any plan to the mint token or burn token are better to move to the execution queue of `Timelock` and also add an `emit event`, or make the owner Multi-sig.

Recommendation

In general, we strongly encourage the centralized privileges or roles in the protocol to be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices.

Indicatively, here are some feasible solutions that would also mitigate the potential risk based on your business flow:

- Time-lock with reasonable latency, i.e. 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

`[CertiK]`: Currently, contract `GoMining.sol` is deployed at address `0x7ddc52c4de30e94be3a6a0a2b259b2850f421989` on Ethereum. The owner of this contract is a multisig GnosisSafeProxy contract at address `0x17b9705e9cbffbadeae6a9190fa2e62865c08d6d`.

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.

Gas Optimization

Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

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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