CERTIK

Security Assessment

Amazy Token

May 30th, 2022

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Summary

This report has been prepared for Amazy to discover issues and vulnerabilities in the source code of the Amazy Token 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	Amazy Token
Platform	BSC
Language	Solidity
Codebase	https://testnet.bscscan.com/address/0x4Ab7C1BE7a1d4a6b4Ab00c25b6a6FFF71A8328A0#code
Commit	

Audit Summary

Delivery Date	May 30, 2022 UTC
Audit Methodology	Static Analysis, Manual Review

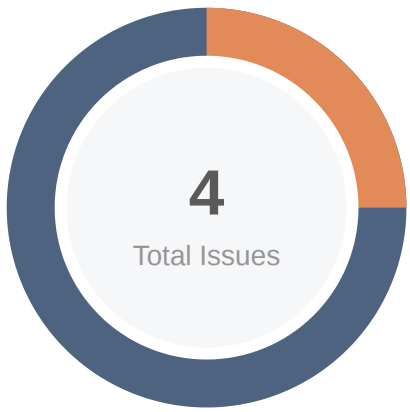
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Mitigated	Partially Resolved	Resolved
Critical	0	0	0	0	0	0	0
Major	1	0	0	1	0	0	0
Medium	0	0	0	0	0	0	0
Minor	0	0	0	0	0	0	0
Informational	3	0	0	3	0	0	0
Discussion	0	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
ATC	AmazyToken.sol	ebc022d46b6cc0e9646370315fd14a7ddce1861774168af3430d0d3363299f86

Findings



Critical	**0** (0.00%)
Major	**1** (25.00%)
Medium	**0** (0.00%)
Minor	**0** (0.00%)
Informational	**3** (75.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
ATC-01	Centralization Risks In AmazyToken.sol	**Centralization / Privilege**	**Major**	Acknowledged
ATC-02	Function Visibility Optimization	Gas Optimization	Informational	Acknowledged
ATC-03	Redundant Code Components	Volatile Code	Informational	Acknowledged
ATC-04	Redundant Variable Initialization	Gas Optimization	Informational	Acknowledged

ATC-01 | Centralization Risks In AmazyToken.sol

Category	Severity	Location	Status
Centralization / Privilege	**Major**	AmazyToken.sol: 370, 383, 401, 1077, 1097, 1101, 1105	Acknowledged

Description

In the contract `AmazyToken`, the role `DEFAULT_ADMIN_ROLE` has authority over the functions shown below.
Any compromise to the `DEFAULT_ADMIN_ROLE` account may allow the hacker to take advantage of this authority and

- grant a new role to any account through `grantRole()`
- revoke a role from accounts through `revokeRole()`
- renounce admin role through `renounceRole()`

The role `PAUSER_ROLE` has authority over the functions shown below
Any compromise to the `PAUSER_ROLE` account may allow the hacker to take advantage of this authority and

- pause all transfers, minting and burning through `pause()`
- unpause through `unpause()`
- renounce the pauser role through `renounceRole()`

The role `MINTER_ROLE` has authority over the functions shown below
Any compromise to the `MINTER_ROLE` account may allow the hacker to take advantage of this authority and

- mint uncapped tokens on any account through `mint()`
- mint uncapped tokens on multiple accounts through `multiMint()`
- renounce minter role through `renounceRole()`

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., multisignature 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 (⅔, ⅗) 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

No alleviation.

ATC-02 | Function Visibility Optimization

Category	Severity	Location	Status
Gas Optimization	Informational	AmazyToken.sol: 59, 305, 370, 383, 401, 749, 761, 784, 806, 829, 849, 1046, 1061, 1105	Acknowledged

Description

The linked functions are declared as `public`, contain array function arguments, and are not invoked in any of the contracts contained within the project's scope. The functions that are never called internally within the contract should have external visibility.

Recommendation

We advise that the functions' visibility specifiers are set to `external` and the array-based arguments change their data location from `memory` to `calldata`, optimizing the gas cost of the function.

Alleviation

No alleviation.

ATC-03 | Redundant Code Components

Category	Severity	Location	Status
Volatile Code	Informational	AmazyToken.sol: 232, 425, 434	Acknowledged

Description

The linked statements do not affect the functionality of the codebase and appear to be either leftovers from test code or older functionality.

Recommendation

We advise to remove the redundant statements for production environments.

Alleviation

`[Client]`: Issue acknowledged. I won't make any changes for the current version.

ATC-04 | Redundant Variable Initialization

Category	Severity	Location	Status
Gas Optimization	Informational	AmazyToken.sol: 493	Acknowledged

Description

The `bool` type variable on the aforementioned line is redundantly assigned with the default value of `false`.

Recommendation

We advise that the linked initialization statements are removed from the codebase to increase legibility.

Alleviation

No alleviation.

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.

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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