Security Assessment

WanakaFarm

Aug 20th, 2021

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Summary

This report has been prepared for Wanaka Farm to discover issues and vulnerabilities in the source code of the WanakaFarm 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	WanakaFarm
Platform	BSC
Language	Solidity
Codebase	https://github.com/Wanaka-Inc/Token-IDO/tree/ce7d9a816599b44b0e7283a54d2e43f5c25793c2
Commit	• ce7d9a816599b44b0e7283a54d2e43f5c25793c2 • 1272dd0ea4eb68abda89ca3cf0ce2400471d4551

Audit Summary

Delivery Date	Aug 20, 2021
Audit Methodology	Static Analysis, Manual Review
Key Components	

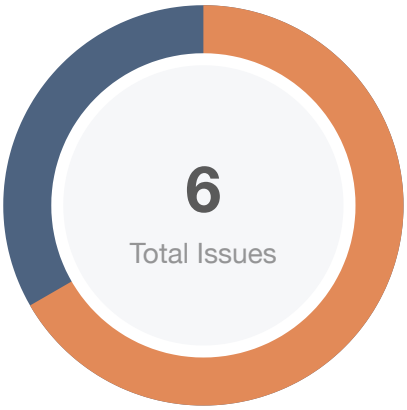
Vulnerability Summary

Vulnerability Level	Total	Pending	Declined	Acknowledged	Partially Resolved	Resolved
Critical	0	0	0	0	0	0
Major	4	0	0	4	0	0
Medium	0	0	0	0	0	0
Minor	0	0	0	0	0	0
Informational	2	0	0	0	0	2
Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
PRC	commons/PermissionRight.sol	d8cf74572cf99469e925ee514550eda6fd303e5dd524f38313076904c40f114f
WTC	WaiToken.sol	786dc640d451ac1e3f943e118aee05eb5ca63c3e9f8ce5856107eddbaad3e955
WFC	WanakaFarm.sol	e942552c62ca5ddfc23f73ad9e233513c65778e11c4f8f39b331a74571a8b71d

Findings



Critical	**0** (0.00%)
Major	**4** (66.67%)
Medium	**0** (0.00%)
Minor	**0** (0.00%)
Informational	**2** (33.33%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
PRC-01	Centralization Risk in Permission Right	**Centralization / Privilege**	**Major**	Acknowledged
PRC-02	Centralization Risk in Permission Right	**Centralization / Privilege**	**Major**	Acknowledged
PRC-03	Lack of Event Emission for Significant Transactions	Logical Issue	Informational	Resolved
WFC-01	Centralized Risk with Initial token distribution	**Centralization / Privilege**	**Major**	Acknowledged
WFC-02	Inconsistent Comment	Coding Style	Informational	Resolved
WTC-01	Centralization Risk in `mint` function	**Centralization / Privilege**	**Major**	Acknowledged

PRC-01 | Centralization Risk in Permission Right

Category	Severity	Location	Status
Centralization / Privilege	**Major**	commons/PermissionRight.sol: 27, 32	Acknowledged

Description

In the contract `PermissionRight`, the role `owner` has the authority to call the following functions to update admin users:

- `PermissionRight.addAdminUser(address)`: The `owner` can add arbitrary candidate be an admin user.
- `PermissionRight.removeAdminUser(address)`: The `owner` can remove arbitrary admin user.

Any compromise to the `owner` account may allow the hacker to manipulate the project through these functions.

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 goal:

- 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

[WanakaFarm]: The team acknowledged the issue, and plan to have the owner of the contract manage by a multi-sig wallet from some special users.

PRC-02 | Centralization Risk in Permission Right

Category	Severity	Location	Status
Centralization / Privilege	**Major**	commons/PermissionRight.sol: 37, 42	Acknowledged

Description

In the contract `PermissionRight`, the role `adminGroup` has the authority to call the following functions to update operators:

- `PermissionRight.addOperatorUser(address)`: The `adminGroup` can add arbitrary candidate be an operator user.
- `PermissionRight.removeOperatorUser(address)`: The `adminGroup` can remove arbitrary operator user.
-

The contract will have more than one `adminGroup` address. Any compromise to the `adminGroup` account(s) may allow the hacker to manipulate the project through these functions.

Recommendation

We advise the client to carefully manage the `adminGroup` accounts' 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 goal:

- 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

[WanakaFarm]: The team acknowledged the issue. After the system is running persistent, the team will consider passing the owner key to our community through a DAO to adjust all parameters in the smart contract. Admins are trusted to manage the whole platform.

PRC-03 | Lack of Event Emission for Significant Transactions

Category	Severity	Location	Status
Logical Issue	Informational	commons/PermissionRight.sol: 32, 42, 46, 50	Resolved

Description

The functions that affect the status of sensitive variables or roles should emit events as notifications to the public. For example:

- `PermissionRight.removeAdminUser()`
- `PermissionRight.removeOperatorUser()`
- `PermissionRight._addOperatorUser()`
- `PermissionRight._addAdminUser()`

Recommendation

We recommend adding events for the sensitive actions and emitting them in the corresponding functions.

Alleviation

[WanakaFarm]: The team addressed the issue and reflected in the commit 1272dd0ea4eb68abda89ca3cf0ce2400471d4551

WFC-01 | Centralized Risk with Initial token distribution

Category	Severity	Location	Status
Centralization / Privilege	**Major**	WanakaFarm.sol: 21	Acknowledged

Description

In the contract `WanakaFarm`, the constructor will mint all the tokens with the amount `INITIAL_SUPPLY` to the given `_owner` account and transfer the ownership.

Any compromise to the `owner` account(s) may allow the hacker to manipulate the project through these functions.

Recommendation

We advise the client to carefully manage the `owner` accounts 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 goal:

- 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

[WanakaFarm]: The team acknowledged the issue, and plan to have the owner of the contract managed by a multi-sig wallet from some special users.

WFC-02 | Inconsistent Comment

Category	Severity	Location	Status
Coding Style	Informational	WanakaFarm.sol: 12	Resolved

Description

The comment in the aforementioned line states 200M tokens, while the implementation assigns 500M to the state variable `INITIAL_SUPPLY`:

```
12      uint256 private constant INITIAL_SUPPLY = 500 * 10**(6 + 18); // 200M tokens
```

Recommendation

We recommend revising the comment or implementation in the aforementioned line to make them consistent.

Alleviation

[WanakaFarm]: The team addressed the issue and reflected in the commit [1272dd0ea4eb68abda89ca3cf0ce2400471d4551]

WTC-01 | Centralization Risk in `mint` function

Category	Severity	Location	Status
Centralization / Privilege	**Major**	WaiToken.sol: 32	Acknowledged

Description

In the contract `WaiToken`, the role `adminGroup` has the authority to call the following function to mint tokens:

- `WaiToken.mint(address, uint256)`: The `adminGroup` can mint any amount of the token to an arbitrary account.

The contract will have more than one `adminGroup` address. Any compromise to the `adminGroup` account(s) may allow the hacker to manipulate the project through these functions.

Recommendation

We advise the client to carefully manage the `adminGroup` accounts 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 goal:

- 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

[WanakaFarm]: The team acknowledged the issue. After the system is running persistent, the team will consider passing the owner key to our community through a DAO to adjust all parameters in the smart contract. Admins are trusted to manage the whole platform.

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.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

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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