CERTIK

Security Assessment

TON Vesting

Aug 5th, 2022

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Disclaimer

About

Summary

This report has been prepared for The Open Network to discover issues and vulnerabilities in the source code of the TON Vesting project. A comprehensive examination has been performed, utilizing Manual Review technique.

The auditing process pays special attention to the following considerations:

- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that range from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices.

We suggest the following recommendations that could better serve the project from the security perspective:

- Document all the code functionality related to interaction with the users;
- Introduce the structure declaration concept into FunC;
- Introduce the constant declaration concept into FunC;
- Provide more comments per each function for better readability;
- Avoid using of `var` placeholder instead of explicit type specification;
- Introduce type specification in function declaration for arguments and return values.

Overview

Project Summary

Project Name	TON Vesting
Platform	TON
Language	FunC
Codebase	https://github.com/ton-blockchain/lockup-wallet-contract
Commit	base 589d65f7c6f1b23a6ac17fdac3740f1bf660efa5 update1 e3f46358ac3441da387f0b52a8096e7beb96f093

Audit Summary

Delivery Date	Aug 05, 2022 UTC
Audit Methodology	Manual Review

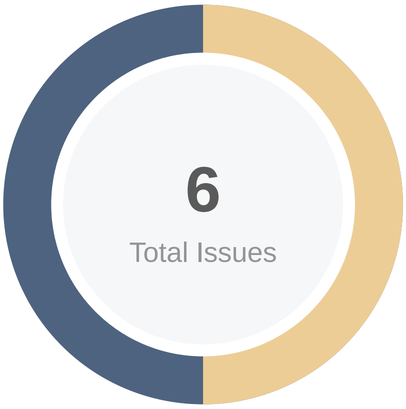
Vulnerability Summary

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

Audit Scope

ID	File	SHA256 Checksum
UNI	universal/uni-lockup-wallet.fc	a4134014c68a5b93312b3ef3ddb183c7061de82c495906dafb6cd7cb829ab8a2
VES	vesting/vesting-lockup-wallet.fc	2dadc76a69e2219b1ef22e3497c4ce579b5e0f1293ab6b9a6831d14f70a4a19d

Findings



🟥	**Critical**	**0** (0.00%)
🟧	**Major**	**0** (0.00%)
🟨	**Medium**	**0** (0.00%)
🟨	**Minor**	**3** (50.00%)
🟦	**Informational**	**3** (50.00%)
🟩	**Discussion**	**0** (0.00%)

ID	Title	Category	Severity	Status
589-01	Using Of Arbitrary Integers In Bitwise Logical Operations	Volatile Code	● Minor	Partially Resolved
UNI-01	`uint` Values Are Stored As `int`	Volatile Code	● Minor	ⓘ Acknowledged
UNI-02	Function Return Value And Argument Types Are Not Explicitly Specified	Coding Style	● Informational	ⓘ Acknowledged
VES-01	`send_raw_message()` Is Used In "Ignore Errors" Mode	Volatile Code	● Minor	✓ Resolved
VES-02	Improper Usage Of `impure` Modifier	Language Specific	● Informational	✓ Resolved
VES-03	Code Duplication	Coding Style	● Informational	Partially Resolved

589-01 | Using Of Arbitrary Integers In Bitwise Logical Operations

Category	Severity	Location	Status
Volatile Code	● Minor	universal/uni-lockup-wallet.fc (base): 151~152, 156~157; vesting/vesting-lockup-wallet.fc (base): 60~61	Partially Resolved

Description

`allow_elector` and `can_use_restricted` are 1-bit uint. However, they are used as part of logical expression. This can lead to accidental errors, like:

```
if (3 & 4) {
  ;; never happens
}
```

Recommendation

We recommend always using bool operands in bitwise logical operations, like `(allow_elector == 1)`.

Alleviation

[CertiK]: `uni-lockup-wallet.fc` was not updated.

UNI-01 | `uint` Values Are Stored As `int`

Category	Severity	Location	Status
Volatile Code	● Minor	universal/uni-lockup-wallet.fc (base): 53~55	ⓘ Acknowledged

Description

`seqno` and `subwallet_id` are saved into storage via `store_int()` but loaded via `load_uint()`. This can lead to exceptions in case of negative/too big values.

Recommendation

We recommend using of `store_uint()` for saving of `seqno` and `subwallet_id`.

UNI-02 | Function Return Value And Argument Types Are Not Explicitly Specified

Category	Severity	Location	Status
Coding Style	● Informational	universal/uni-lockup-wallet.fc (base): 16~17, 21~22, 33~34, 50~51	ⓘ Acknowledged

Description

Function declarations contain `_` instead of real return type. Argument types are omitted.

Recommendation

We recommend explicitly specifying the return value and argument types for a better code readability.

VES-01 | `send_raw_message()` Is Used In "Ignore Errors" Mode

Category	Severity	Location	Status
Volatile Code	● Minor	vesting/vesting-lockup-wallet.fc (base): 44~45, 68~69	✓ Resolved

Description

`mode = 3` means: +1 - sender pays fees, +2 - ignore errors. It is unclear, why "ignore errors" mode is enforced by the contract.

Recommendation

We recommend not restricting the mode values provided by the contract user or clarifying the intended behavior via code comments.

VES-02 | Improper Usage Of `impure` Modifier

Category	Severity	Location	Status
Language Specific	● Informational	vesting/vesting-lockup-wallet.fc (base): 22~23	✓ Resolved

Description

The function `recv_internal()` is defined as `impure`, but it does not modify the storage or throw an exception.

Recommendation

We recommend removing the `impure` modifier in the function definition.

VES-03 | Code Duplication

Category	Severity	Location	Status
Coding Style	● Informational	vesting/vesting-lockup-wallet.fc (base): 32~33, 55~59, 98~99, 99~103, 108~109	Partially Resolved

Description

Loading data from the storage is done by the identical code several times. `locked_amount` calculation is done by the identical code two times.

Recommendation

We recommend extracting the shared functionality into a separate function to improve the code maintainability. We recommend utilizing of `end_parse()` to ensure the data is in expected format.

Alleviation

[CertiK]: `locked_amount` calculation is done by the identical code two times.

Appendix

Finding Categories

Volatile Code

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

Language Specific

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

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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