Security Assessment

Shiryo-Inu-Audit

Nov 12th, 2021

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Summary

This report has been prepared for Shiryo-Inu-Audit to discover issues and vulnerabilities in the source code of the Shiryo-Inu-Audit 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.

Additionally, this audit is based on a premise that all external contracts were implemented safely.

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	Shiryo-Inu-Audit
Platform	ethereum
Language	Solidity
Codebase	https://etherscan.io/address/0x1e2f15302b90edde696593607b6bd444b64e8f02#code
Commit	

Audit Summary

Delivery Date	Nov 12, 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	2	0	0	0	0	2
Medium	0	0	0	0	0	0
Minor	1	0	0	1	0	0
Informational	7	0	0	7	0	0
Discussion	0	0	0	0	0	0

Audit Scope

ID	File	SHA256 Checksum
SIS	Shiryolnu.sol	9a24071116b1f03aa83ca4e2280a57679f29bda18096024c77bfe60bd184cab7

Understandings

Privileged Functions

The contract contains the following privileged functions that are restricted by some modifiers. They are used to modify the contract configurations and address attributes. We grouped these functions below:

The `onlyOwner` modifier:

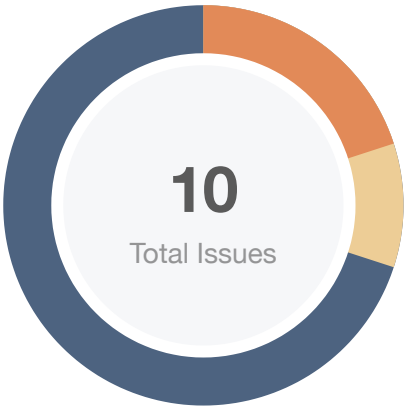
Contract `Ownable`:

- renounceOwnership()

Contract `ShiryoInu`:

- setCooldownEnabled(bool onoff)
- openTrading()
- setBots(address[] memory bots_)
- delBot(address notbot)

Findings



Critical	**0** (0.00%)
Major	**2** (20.00%)
Medium	**0** (0.00%)
Minor	**1** (10.00%)
Informational	**7** (70.00%)
Discussion	**0** (0.00%)

ID	Title	Category	Severity	Status
GLOBAL-01	Unlocked Compiler Version	Language Specific	Informational	Acknowledged
GLOBAL-02	Centralization Risk	**Centralization / Privilege**	**Major**	Resolved
GLOBAL-03	Function Visibility Optimization	Gas Optimization	Informational	Acknowledged
GLOBAL-04	Missing Emit Events	Coding Style	Informational	Acknowledged
SIS-01	Unused Variable	Gas Optimization	Informational	Acknowledged
SIS-02	Potential Sandwich Attacks	Logical Issue	Minor	Acknowledged
SIS-03	Optimized Judgment Logic	Gas Optimization	Informational	Acknowledged
SIS-04	Using both `uint` and `uint256`	Coding Style	Informational	Acknowledged
SIS-05	Too Many Digits	Coding Style	Informational	Acknowledged
SIS-06	Centralized risk in `openTrading`	**Centralization / Privilege**	**Major**	Resolved

GLOBAL-01 | Unlocked Compiler Version

Category	Severity	Location	Status
Language Specific	Informational	Global	Acknowledged

Description

The following contracts have unlocked compiler versions. An unlocked compiler version in the source code of the contract permits the user to compile it at or above a particular version. This, in turn, leads to differences in the generated bytecode between compilations due to differing compiler version numbers. This can lead to ambiguity when debugging as compiler specific bugs may occur in the codebase that would be difficult to identify over a span of multiple compiler versions rather than a specific one.

- Shiryolnu.sol

Recommendation

We advise that the compiler version is alternatively locked at the lowest version possible that the contract can be compiled at. For example, for version `v0.6.2` the contract should contain the following line:

```
pragma solidity 0.6.2;
```

Alleviation

No alleviation.

GLOBAL-02 | Centralization Risk

Category	Severity	Location	Status
Centralization / Privilege	**Major**	**Global**	Resolved

Description

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

- renounceOwnership()

In the contract `ShiryoInu`, the role `owner` has the authority over the following function:

- setCooldownEnabled()
- openTrading()
- setBots()
- delBot()

In the contract `ShiryoInu`, the role `feeAddrWallet1` has the authority over the following function:

- manualswap()
- manualsend()

Any compromise to these accounts may allow the hacker to manipulate the project through these functions.

Recommendation

We advise the client to carefully manage the `owner/feeAddrWallet1` 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 are some feasible suggestions that would also mitigate the potential risk at the different levels in terms of short-term and long-term:

- 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

The owner of the contract is renounced so no function can be called anymore.

Transaction Hash:0x8653978969e52bd3741ee0a6d2131af72d47234802114b26be1c283de2dddb2f

GLOBAL-03 | Function Visibility Optimization

Category	Severity	Location	Status
Gas Optimization	Informational	Global	Acknowledged

Description

The following functions are declared as `public` 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.

contract `Ownable`

- `renounceOwnership()` in L105

contract `ShiryoInu`

- `transfer()` in L202
- `approve()` in L211
- `transferFrom()` in L216
- `setBots()` in L305
- `delBot()` in L311

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.

GLOBAL-04 | Missing Emit Events

Category	Severity	Location	Status
Coding Style	Informational	Global	Acknowledged

Description

The function that affects the status of sensitive variables should be able to emit events as notifications to customers.

contract `ShiryoInu`

- `setCooldownEnabled()`
- `setBots()`
- `delBot()`

Recommendation

We advise the client to add events for sensitive actions, and emit them in the function.

Alleviation

No alleviation.

SIS-01 | Unused Variable

Category	Severity	Location	Status
Gas Optimization	Informational	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 139	Acknowledged

Description

`_tOwned` is not used elsewhere in the contract.

Recommendation

We recommend to remove the unused variable if it is not intended to be used.

Alleviation

No alleviation.

SIS-02 | Potential Sandwich Attacks

Category	Severity	Location	Status
Logical Issue	Minor	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 277~283	Acknowledged

Description

A sandwich attack might happen when an attacker observes a transaction swapping tokens or adding liquidity without setting restrictions on slippage or minimum output amount. The attacker can manipulate the exchange rate by frontrunning (before the transaction being attacked) a transaction to purchase one of the assets and make profits by backrunning (after the transaction being attacked) a transaction to sell the asset.

The following functions are called without setting restrictions on slippage or minimum output amount, so transactions triggering these functions are vulnerable to sandwich attacks, especially when the input amount is large:

- `uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens()`

Recommendation

We recommend setting reasonable minimum output amounts, instead of 0, based on token prices when calling the aforementioned functions.

Alleviation

No alleviation.

SIS-03 | Optimized Judgment Logic

Category	Severity	Location	Status
Gas Optimization	Informational	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 243~244, 255~258	Acknowledged

Description

The variable assignment in lines 255-258 is the same as the variable assignment in lines 243-244. In other words, no matter whether the judgment condition of line 255 is satisfied, the values of `_feeAddr1` and `_feeAddr2` remain unchanged.

Recommendation

We recommend to delete lines 255~258 of code or modify the relevant logic.

Alleviation

No alleviation.

SIS-04 | Using both `uint` and `uint256`

Category	Severity	Location	Status
Coding Style	Informational	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 143	Acknowledged

Description

Although `uint` and `uint256` are the same, we recommend keeping the consistancy of the code style and using the explicit version of `uint`.

Recommendation

We recommend changing `uint` at the aforementioned lines to `uint256` .

Alleviation

No alleviation.

SIS-05 | Too Many Digits

Category	Severity	Location	Status
Coding Style	Informational	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 145, 300	Acknowledged

Description

Literals with many digits are difficult to read and review.

Recommendation

We recommend modifying as below:

```
145  uint256 private constant _tTotal = 1e18 * 10**9;
```

```
300  _maxTxAmount = 5e16 * 10**9;
```

Alleviation

No alleviation.

SIS-06 | Centralized risk in `openTrading`

Category	Severity	Location	Status
Centralization / Privilege	**Major**	projects/Shiryo-Inu-Audit/ShiryoInu.sol (2336203): 297	Resolved

Description

```
297  uniswapV2Router.addLiquidityETH{value: address(this).balance}
(address(this),balanceOf(address(this)),0,0,owner(),block.timestamp);
```

The `addLiquidity` function calls the `uniswapV2Router.addLiquidityETH` function with the `to` address specified as `owner()` for acquiring the generated LP tokens from the `Shiryo-Inu-ETH` pool. As a result, over time the `_owner` address will accumulate a significant portion of LP tokens.If the `_owner` is an EOA (Externally Owned Account), mishandling of its private key can have devastating consequences to the project as a whole.

Recommendation

We advise the `to` address of the `uniswapV2Router.addLiquidityETH` function call to be replaced by the contract itself, i.e. `address(this)`, and to restrict the management of the LP tokens within the scope of the contract's business logic. This will also protect the LP tokens from being stolen if the `_owner` account is compromised. In general, we strongly recommend centralized privileges or roles in the protocol to be improved via a decentralized mechanism or via smart-contract based accounts with enhanced security practices, f.e. Multisignature wallets.

Indicatively, here are some feasible solutions that would also mitigate the potential risk:

- Time-lock with reasonable latency, i.e. 48 hours, for awareness on privileged operations;
- Assignment of privileged roles to multi-signature wallets to prevent single point of failure due to the private key;
- Introduction of a DAO / governance / voting module to increase transparency and user involvement.

Alleviation

`_owner` has been set to address 0, LP Tokens will be transferred to this address.

Transaction Hash:[0x8653978969e52bd3741ee0a6d2131af72d47234802114b26be1c283de2dddb2f]

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.

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.

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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