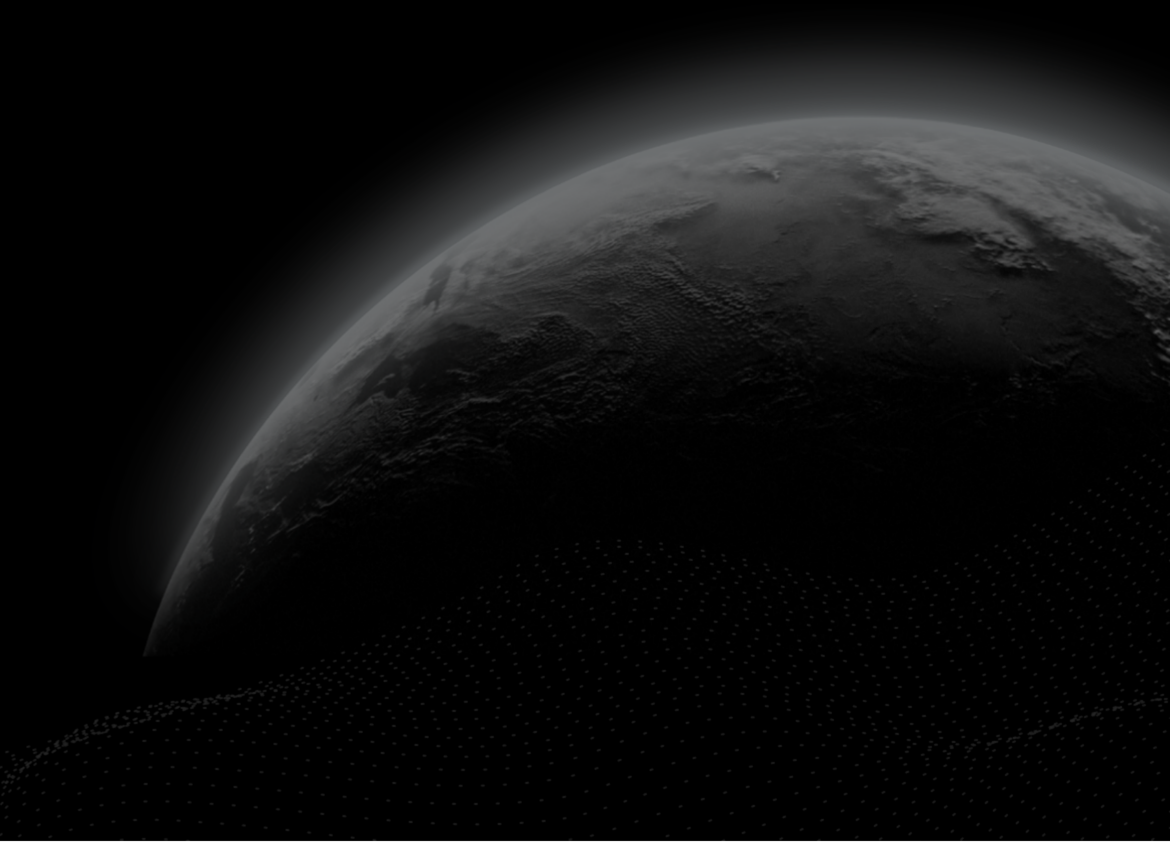
Security Assessment

Ailey

CertiK Assessed on Sept 19th, 2023



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The security assessment was prepared by CertiK, the leader in Web3.0 security.

Executive Summary

TYPES	ECOSYSTEM	METHODS
BEP-20	Binance Smart Chain (BSC)	Manual Review, Static Analysis
LANGUAGE	**TIMELINE**	**KEY COMPONENTS**
Solidity	Delivered on 09/19/2023	N/A

CODEBASE

mainnet

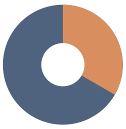
View All in Codebase Page

COMMITS

0x9dce13e71b11eb5df66ca269bd657696587fd4e2

View All in Codebase Page

Vulnerability Summary



3	0	0	0	3	0
Total Findings	Resolved	Mitigated	Partially Resolved	Acknowledged	Declined

🟥	0	Critical		Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.
🟧	1	Major	1 Acknowledged	Major risks can include centralization issues and logical errors. Under specific circumstances, these major risks can lead to loss of funds and/or control of the project.
🟨	0	Medium		Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.
🟨	0	Minor		Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.
🟦	2	Informational	2 Acknowledged	Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

TABLE OF CONTENTS | AILEY

CODEBASE | AILEY

Repository

mainnet

Commit

0x9dce13e71b11eb5df66ca269bd657696587fd4e2

AUDIT SCOPE | AILEY

1 file audited ● 1 file with Acknowledged findings

ID	File	SHA256 Checksum
● AIL	Ailey.sol	a6e61d12ad513d94637ded005454d26cfccc75d0c8d1119956d8133ffbf6de04

APPROACH & METHODS | AILEY

This report has been prepared for Ailey to discover issues and vulnerabilities in the source code of the Ailey project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Manual Review and 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:

- Testing the smart contracts against both common and uncommon attack vectors;
- 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.

REVIEW NOTES | AILEY

Overview

The `Ailey` is a standard ERC20 token project. The focus of this audit is the token contract.

External Dependencies

The following are external contracts referred to in the contracts. The contract mainly uses OpenZeppelin contracts and libraries for the templates and setup of contracts:

- `Counters` , `IERC5267` , `StorageSlot` , `ShortStrings` , `SignedMath` , `Math` , `Strings` , `ECDSA` , `EIP712` , `IERC20Permit` , `Context` , `IERC20` , `IERC20Metadata` , `ERC20` & `ERC20Permit` .

Since the OpenZeppelin contracts are actively developed, we recommend the team continuously monitor the library change to avoid unexpected failure.

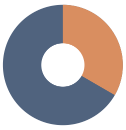
On-chain analysis

The contract `Ailey` is deployed at BSC 0x9dce13e71b11eb5df66ca269bd657696587fd4e2 by the EOA account 0x653f5c544b0053f32d04407c1ceec5789c8a9e12.

As the time of 09/14/2023, all the `Ailey` tokens have been transferred to the following accounts by the initial token holder 0x653f5c544b0053f32d04407c1ceec5789c8a9e12.

- 0x3726B181FF6aeC590932044410ff4A07Ab232073 - 400,000,000 EOA
- 0x4933f82e6cd2b6aee34f25e330b49F7609E50236 - 155,000,000 TokenVesting contract
- 0xbc9dC203abe6E93F1392FFc0A1c23cB1a4934a32 - 132,500,000 TokenVesting contract
- 0x5adfa7257dC7E445B3fA1e0B4b37317C25F448a1 - 100,000,000 TokenVesting contract
- 0x7c4f6Fc652c95aB24024d4Cbd321d6260BF2eFB9 - 70,000,000 TokenVesting contract
- 0x87deE7E40eE255440b3cC98E97f56F182f947930 - 50,000,000 EOA
- 0xB38c3FAe7410AD98fcFAbca5b2e2F5f7f386E2D2 - 33,750,000 TokenVesting contract
- 0xB9fB1ede5abF2b399523CF75F62eF3047002eFF1 - 20,000,000 TokenVesting contract
- 0x7f5f695034E230E3D671576448089f59188A2aEC - 18,750,000 EOA
- 0xF5D14976190B974457e33D402D35154D2ecC05e7 - 10,000,000 EOA
- 0xA73937a719D6E68c2df426cDA420D4C7059d2505 - 10,000,000 EOA

FINDINGS | AILEY



Total Findings	Critical	Major	Medium	Minor	Informational
3	0	1	0	0	2

This report has been prepared to discover issues and vulnerabilities for Ailey. Through this audit, we have uncovered 3 issues ranging from different severity levels. Utilizing the techniques of Manual Review & Static Analysis to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
AIL-02	**Initial Token Distribution**	**Centralization**	**Major**	● **Acknowledged**
AIL-01	Discussion On `permit()` Function	Design Issue	Informational	● Acknowledged
AIL-03	Solidity Version 0.8.20 May Not Work On Other Chains Due To `PUSH0`	Logical Issue	Informational	● Acknowledged

AIL-02 | INITIAL TOKEN DISTRIBUTION

Category	Severity	Location	Status
Centralization	● **Major**	**Ailey.sol: 1856**	● **Acknowledged**

Description

All of the `Ailey` tokens are sent to the contract deployer or one or several externally-owned account (EOA) addresses. This is a centralization risk because the deployer or the owner(s) of the EOAs can distribute tokens without obtaining the consensus of the community. Any compromise to these addresses may allow a hacker to steal and sell tokens on the market, resulting in severe damage to the project.

On-chain analysis

As the time of 09/14/2023, all the `Ailey` tokens have been transferred to the following accounts by the initial token holder 0x653f5c544b0053f32d04407c1ceec5789c8a9e12.

- 0x3726B181FF6aeC590932044410ff4A07Ab232073 - 400,000,000 EOA
- 0x4933f82e6cd2b6aee34f25e330b49F7609E50236 - 155,000,000 TokenVesting contract
- 0xbc9dC203abe6E93F1392FFc0A1c23cB1a4934a32 - 132,500,000 TokenVesting contract
- 0x5adfa7257dC7E445B3fA1e0B4b37317C25F448a1 - 100,000,000 TokenVesting contract
- 0x7c4f6Fc652c95aB24024d4Cbd321d6260BF2eFB9 - 70,000,000 TokenVesting contract
- 0x87deE7E40eE255440b3cC98E97f56F182f947930 - 50,000,000 EOA
- 0xB38c3FAe7410AD98fcFAbca5b2e2F5f7f386E2D2 - 33,750,000 TokenVesting contract
- 0xB9fB1ede5abF2b399523CF75F62eF3047002eFF1 - 20,000,000 TokenVesting contract
- 0x7f5f695034E230E3D671576448089f59188A2aEC - 18,750,000 EOA
- 0xF5D14976190B974457e33D402D35154D2ecC05e7 - 10,000,000 EOA
- 0xA73937a719D6E68c2df426cDA420D4C7059d2505 - 10,000,000 EOA

Recommendation

It is recommended that the team be transparent regarding the initial token distribution process. The token distribution plan should be published in a public location that the community can access. The team should make efforts to restrict access to the private keys of the deployer account or EOAs. A multi-signature (⅔, ⅗) wallet can be used to prevent a single point of failure due to a private key compromise. Additionally, the team can lock up a portion of tokens, release them with a vesting schedule for long-term success, and deanonymize the project team with a third-party KYC provider to create greater accountability.

Alleviation

[Ailey Team, 09/15/2023]: The team acknowledged this issue and decided not to change the codebase this time.

[CertiK, 09/15/2023]: It is suggested to implement the aforementioned methods to increase the transparency and security regarding the initial token distribution process and avoid the centralized failure. Also, it strongly encourages the project team periodically revisit the private key security management of all addresses related to centralized roles.

[Ailey Team, 09/19/2023]: The team shared a link to the token distribution plan: https://project-ailey.gitbook.io/project-ailey/project-ailey/tokenomics/vesting-plan.

They also stated that the tokens in these four EOA accounts will also be used for vesting.

- 0x87deE7E40eE255440b3cC98E97f56F182f947930 - 50,000,000 EOA
- 0x7f5f695034E230E3D671576448089f59188A2aEC - 18,750,000 EOA
- 0xF5D14976190B974457e33D402D35154D2ecC05e7 - 10,000,000 EOA
- 0xA73937a719D6E68c2df426cDA420D4C7059d2505 - 10,000,000 EOA

[CertiK, 09/19/2023]: The measures taken by the team have improved the transparency of the initial token distribution. It is suggested to maintain the transparency in a timely manner and take measures to increase security regarding the initial token distribution process and avoid centralized failure. Also, it strongly encourages the project team periodically revisit the private key security management of all addresses related to centralized roles.

AIL-01 | DISCUSSION ON `permit()` FUNCTION

Category	Severity	Location	Status
Design Issue	● Informational	Ailey.sol: 1810	● Acknowledged

Description

In the contract `ERC20Permit` , the `permit()` function is able to perform the approval. However, it is noted that the structure of `_nonces` is a mapping of addresses to `Counters.Counter` and the `_nonces[owner]` will increase after used successfully, which implies the `owner` has at most one valid signature, even for different `spender` .

Recommendation

We would like to confirm if current implementation matches the intended design.

Alleviation

[Ailey Team, 09/15/2023]: The team acknowledged this issue and decided not to change the codebase this time.

AIL-03 | SOLIDITY VERSION 0.8.20 MAY NOT WORK ON OTHER CHAINS DUE TO `PUSH0`

Category	Severity	Location	Status
Logical Issue	● Informational	Ailey.sol: 1850	● Acknowledged

Description

The compiler for Solidity 0.8.20 switches the default target EVM version to Shanghai, which includes the new `PUSH0` op code. This op code may not yet be implemented on all L2s, so deployment on these chains will fail. To work around this issue, use an earlier EVM version

Recommendation

It's recommended to pay attention to the EVM complier version when using 0.8.20 solidity version in your contract.

Alleviation

[Ailey Team, 09/15/2023]: The team acknowledged this issue and decided not to change the codebase this time.

APPENDIX | AILEY

Finding Categories

Categories	Description
Logical Issue	Logical Issue findings indicate general implementation issues related to the program logic.
Centralization	Centralization findings detail the design choices of designating privileged roles or other centralized controls over the code.
Design Issue	Design Issue findings indicate general issues at the design level beyond program logic that are not covered by other finding categories.

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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