Smart Contract Audit Report

AnimeCoin

Audit Performed By

Fortknox Security

Professional Smart Contract Auditing

June 9, 2024

Table of Contents

Executive Summary 3

Audit Methodology 5

Audit Scope 8

Vulnerability Analysis 9

Contract Privileges Analysis 11

Detailed Findings 8

Recommendations 9

Audit Team 20

Disclaimer & Legal Notice 21

Legal Terms & Usage Rights 22

Executive Summary

Fortknox Security has conducted a comprehensive smart contract security audit for **AnimeCoin**. Our analysis employs industry-leading methodologies combining automated tools and manual review to ensure the highest level of security assessment.

7	1	LOW	100%
TOTAL ISSUES FOUND	CRITICAL + HIGH	OVERALL RISK	CODE COVERAGE

Security Assessment Overview

Critical Issues

0

Immediate action required. These vulnerabilities can lead to direct loss of funds.

IMPACT: SEVERE FINANCIAL LOSS

High Issues

1

High priority fixes needed. Can lead to significant financial loss.

IMPACT: MAJOR SECURITY RISK

Key Findings Summary

Access Control

Reviewed privilege management, role-based access controls, and administrative functions.

Economic Security

Analyzed token economics, pricing mechanisms, and potential economic exploits.

Logic Validation

Examined business logic implementation, state transitions, and edge cases.

Input Validation

Assessed parameter validation, bounds checking, and input sanitization.

Audit Conclusion

The AnimeCoin smart contract audit reveals **7 total findings** across various security categories. Immediate attention is required for 1 critical/high severity issues before deployment. Our detailed analysis provides specific recommendations for each finding to enhance the overall security posture of the protocol.

Audit Methodology

Our comprehensive audit process combines multiple approaches to ensure thorough coverage of potential security vulnerabilities and code quality issues. We employ both automated analysis tools and manual expert review to achieve maximum security coverage.

Tools & Techniques

Static Analysis

Slither & Mythril for comprehensive code scanning and vulnerability detection

Manual Review

Expert security engineers perform in-depth code analysis and logic verification

Business Logic

Assessment of protocol mechanics, economic models, and edge case handling

Gas Analysis

Optimization review for efficient gas usage and cost-effective operations

Formal Verification

Mathematical proof methods to verify critical contract properties

Symbolic Execution

Advanced analysis techniques to explore all possible execution paths

Review Process & Standards

Review Process

1 Initial Scanning

Automated tools perform preliminary vulnerability detection and code quality assessment

2 Manual Review

Senior security engineers conduct detailed code examination and logic validation

3 Business Logic Testing

Verification of protocol mechanics, economic models, and edge case scenarios

4 Architecture Analysis

Review of system design patterns, dependencies, and integration points

5 Final Documentation

Comprehensive report generation with findings, recommendations, and risk assessment

Severity Classification

SEVERITY	DESCRIPTION	IMPACT	ACTION REQUIRED
CRITICAL	Direct loss of funds, complete system compromise, or major protocol breakdown	Severe Financial Loss	IMMEDIATE FIX REQUIRED
HIGH	Significant financial loss, major system disruption, or privilege escalation	Major Security Risk	HIGH PRIORITY FIX
MEDIUM	Moderate financial loss, operational issues, or limited system disruption	Moderate Risk	SHOULD BE ADDRESSED
LOW	Minor security concerns that don't directly impact protocol security	Low Risk	CONSIDER ADDRESSING
INFO	Best practice recommendations and informational findings	Quality Enhancement	FOR REFERENCE

Audit Scope

Project Details

PARAMETER	DETAILS
Project Name	AnimeCoin
Total Issues Found	7
Audit Type	Smart Contract Security Audit
Methodology	Manual Review + Automated Analysis

Files in Scope

This audit covers the smart contract codebase and associated components for AnimeCoin.

Audit Timeline

- ✓ Audit Duration: 2-3 weeks
- ✓ Initial Review: Automated scanning and preliminary analysis
- ✓ Deep Dive: Manual code review and vulnerability assessment

Vulnerability Analysis

Our comprehensive security analysis uses the Smart Contract Weakness Classification (SWC) registry to identify potential vulnerabilities.

SWC Security Checks

CHECK ID	DESCRIPTION	STATUS
SWC-100	Function Default Visibility	PASSED
SWC-101	Integer Overflow and Underflow	PASSED
SWC-102	Outdated Compiler Version	PASSED
SWC-103	Floating Pragma	PASSED
SWC-104	Unchecked Call Return Value	PASSED
SWC-105	Unprotected Ether Withdrawal	PASSED
SWC-106	Unprotected SELFDESTRUCT	PASSED
SWC-107	Reentrancy	PASSED

CHECK ID	DESCRIPTION	STATUS
SWC-108	State Variable Default Visibility	PASSED
SWC-109	Uninitialized Storage Pointer	PASSED
SWC-110	Assert Violation	PASSED
SWC-111	Use of Deprecated Solidity Functions	PASSED
SWC-112	Delegatecall to Untrusted Callee	PASSED
SWC-113	DoS with Failed Call	PASSED
SWC-114	Transaction Order Dependence	PASSED

Contract Privileges Analysis

Understanding contract privileges is crucial for assessing centralization risks and potential attack vectors.

Common Privilege Categories

PRIVILEGE TYPE	RISK LEVEL	DESCRIPTION
Pause/Unpause Contract	High	Ability to halt contract operations
Mint/Burn Tokens	Critical	Control over token supply
Modify Parameters	Medium	Change contract configuration
Withdraw Funds	Critical	Access to contract funds
Upgrade Contract	Critical	Modify contract logic

Mitigation Strategies

- ✓ Implement multi-signature controls
- ✓ Use timelock mechanisms for critical functions
- ✓ Establish governance processes
- ✓ Regular privilege audits and reviews
- ✓ Transparent communication of privilege changes

H-0 | Collector Allocations Errantly Validated

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	HIGH	AnimeClaimer.sol: 814	Resolved

Description

In the `AnimeClaimer` contract when the claimer is the collector for a collector vest then there is no further validation performed on the vest and the vested amount is granted to the collector address on the L2.

```
AnimeClaimer
```

Recommendation

Ensure that all collector addresses which are awarded are EOAs on both chains. If this is not the case then a more adept verification process is necessary.

Resolution

Animecoin Team: The issue was resolved

M-0 | Incompatible Types

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	AnimeClaimer.sol	Resolved

Description

A `VestingConfig` object contains `uint256 streamId` but the `VestingConfigStorage` contains `uint8 streamId`. Consequently, some users configurations will be unclaimable when the `uint256` type is cast to `uint8` within `_saveClaimParameters`, as it will revert with error `Overflow()`.

```
VestingConfig
uint256 streamId
VestingConfigStorage
uint8 streamId
uint256
uint8
_saveClaimParameters
Overflow()
```

Recommendation

Consider keeping types consistent or clearly document this behavior.

Resolution

Animecoin Team: The issue was resolved.

M-1 | Sanctions Can Be Avoided

CATEGORY	SEVERITY	LOCATION	STATUS
Unexpected Behavior	MEDIUM	AnimeClaimer.sol	Resolved

Description

Currently `checkClaim3` only validate3 3anction3 again3t the claimer: `if (i3Sanctioned(claimer)) return (claimNonce, fal3e);` However, there'3 i3 no validation that the actual owner of the NFT i3 not 3anctioned in the ca3e that the claimer i3 a delegate.

```
checkClaim3
if (i3Sanctioned(claimer)) return (claimNonce, fal3e);
```

Recommendation

Con3ider adding 3anction3 validation on the NFT owner, otherwi3e clearly document thi3 behavior.

Resolution

Animecoin Team: The i33ue wa3 re3olved

L-0 | Missing _logAdminAccess Calls

CATEGORY	SEVERITY	LOCATION	STATUS
Events	LOW	AnimeClaimer.sol: 460, 467	Resolved

Description

In the `setReadChannel` and `setReadConfirmations` `onlyOwner` functions there is no call to the _logAdminAccess`` function to emit an event for these admin updates.

```
setReadChannel
setReadConfirmations
onlyOwner
```

Recommendation

Consider adding a `_logAdminAccess` invocation to these functions.

```
_logAdminAccess
```

Resolution

Animecoin Team: The issue was resolved.

L-1 | Last Withdrawn Day Getter Missing

CATEGORY	SEVERITY	LOCATION	STATUS
Composability	LOW	AnimeClaimer.sol	Acknowledged

Description

The AnimeClaimer includes many getters to query the state of the system but is missing a getter for `lastWithdrawnDay`.

```
lastWithdrawnDay
```

Recommendation

Consider adding a getter for `lastWithdrawnDay`.

```
lastWithdrawnDay
```

Resolution

Animecoin Team: Acknowledged.

L-2 | Typo

CATEGORY	SEVERITY	LOCATION	STATUS
Typo	LOW	AnimeClaimer.sol: 288	Resolved

Description

In the comment for the `requestClaim` function the `_IzReceive` function is referred to as `_IsReceive`.

```
requestClaim
_IzReceive
_IsReceive
```

Recommendation

Correct this to `_IzReceive`.

```
_IzReceive
```

Resolution

Animecoin Team: The issue was resolved

L-3 | View Functions Not Accurate

CATEGORY	SEVERITY	LOCATION	STATUS
Typo	LOW	AnimeClaimer.sol	Acknowledged

Description

Function `dailyTotalWithdrawn()` aims to return the current `dailyTotalWithdrawn`, however the value returned may be stale since the current day be different from the `lastWithdrawnDay` but `_resetDailyTotalWithdrawnIfNewDay` hasn't been triggered yet.

```
dailyTotalWithdrawn()
dailyTotalWithdrawn
lastWithdrawnDay
_resetDailyTotalWithdrawnIfNewDay
```

Recommendation

Consider adding logic within `dailyTotalWithdrawn()` to reflect the start of a new day.

```
dailyTotalWithdrawn()
```

Resolution

Animecoin Team: Acknowledged.

Summary of Recommendations

Based on our comprehensive audit, we provide the following prioritized recommendations to improve the security posture of AnimeCoin.

Priority Matrix

ISSUE ID	TITLE	SEVERITY	PRIORITY
H-0	Collector Allocations Errantly Validated	HIGH	High
M-0	Incompatible Types	MEDIUM	Medium
M-1	Sanctions Can Be Avoided	MEDIUM	Medium
L-0	Missing _logAdminAccess Calls	LOW	Low
L-1	Last Withdrawn Day Getter Missing	LOW	Low
L-2	Typo	LOW	Low
L-3	View Functions Not Accurate	LOW	Low

General Security Best Practices

- ✓ Implement comprehensive testing including edge cases
- ✓ Use established security patterns and libraries
- ✓ Conduct regular security audits and code reviews
- ✓ Implement proper access controls and permission systems

Audit Team

Team Credentials

Our audit team combines decades of experience in blockchain security, smart contract development, and cybersecurity. Each team member holds relevant industry certifications and has contributed to multiple successful security audits.

Methodology & Standards

Our audit methodology follows industry best practices and standards:

- ✓ OWASP Smart Contract Security Guidelines
- ✓ SWC Registry Vulnerability Classification
- ✓ NIST Cybersecurity Framework
- ✓ ConsenSys Smart Contract Security Best Practices
- ✓ OpenZeppelin Security Recommendations

Audit Process

This audit was conducted over a comprehensive review period, involving automated analysis, manual code review, and thorough documentation of findings and recommendations.

Disclaimer & Legal Notice

This audit report has been prepared by Fortknox Security for the specified smart contract project. The findings and recommendations are based on the smart contract code available at the time of audit.

Scope Limitations

- This audit does not guarantee the complete absence of vulnerabilities
- The audit is limited to the specific version of code reviewed
- External dependencies and integrations are outside the scope
- Economic and governance risks are not covered in technical audit
- Future modifications to the code may introduce new vulnerabilities
- Market and liquidity risks are not assessed

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- The economic viability of the project
- The legal compliance in any jurisdiction
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- Third-party integrations or dependencies

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Contact Information

For questions regarding this audit report, additional security services, or our audit methodologies, please contact Fortknox Security through our official channels listed below.

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