Smart Contract Audit Report

NFTR

Audit Performed By

Fortknox Security

Professional Smart Contract Auditing

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Executive Summary

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

10	0	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

0

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 NFTR smart contract audit reveals **10 total findings** across various security categories. No critical or high severity issues were identified. 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	NFTR
Total Issues Found	10
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 NFTR.

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

M-0 | Hold Farming Naming Not Free

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	NFTRegistry.sol	Resolved

Description

According to the docs, if an NFT is curated and is in the hold farming period, naming can be free. However, the `changeName` function still expects payment in the specified currency even if the NFT collection is curated and in the hold farming period.

```
changeName
```

Recommendation

Implement logic such that a NFT in the holding period can be named for free.

Resolution

NFTR Team: The suggested changes were implemented.

M-2 | Lost Names With Burnable NFT

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	NFTRegistry.sol	Acknowledged

Description

Consider the scenario where a user registers a special name for their ERC721-compliant burnable NFT. They then proceed to burn their NFT, and ownership is relinquished. As a result, the name of the NFT cannot be changed nor transferred.

Recommendation

Consider whether or not this is expected behavior. If unexpected, add a function so that if an owner does not exist for a particular NFT, then that NFT's registered name can be dereserved.

Resolution

NFTR Team: This is expected behavior.

M-1 | Potential DoS

CATEGORY	SEVERITY	LOCATION	STATUS
Denial-of-Service	LOW	NFTRegistry.sol: 486	Resolved

Description

The `initiateRetroactiveHoldFarming` function calls the `initiateHoldFarmingForNFT` function in the Hold Farming contract 10,000 times. This may exceed the block gas limit and prevent any collection from getting curated.

```
initiateRetroactiveHoldFarming
initiateHoldFarmingForNFT
```

Recommendation

Ensure that the block gas limit limit is not exceed or consider executing calls to `initiateHoldFarmingForNFT` in batches.

```
initiateHoldFarmingForNFT
```

Resolution

Pending resolution.

L-0 | Simpler Code

CATEGORY	SEVERITY	LOCATION	STATUS
Best Practices	LOW	NFTRegistry.sol: 336, 363	Resolved

Description

Line 336: Because `checkOwnership` must get the owner and compare it against the `msg.sender`, the function can simply utilize `getOwner` instead of duplicating the logic for retrieving the NFT owner.

```
checkOwnership
msg.sender
getOwner
```

Recommendation

Implement the above simplifications.

Resolution

NFTR Team: The suggested changes were implemented.

L-1 | Transfer vs TransferFrom

CATEGORY	SEVERITY	LOCATION	STATUS
Best Practices	LOW	NFTRegistry.sol: 507	Resolved

Description

`transferFrom` is used to transfer `RNM` from the `NFTRegistry` contract to the owner, but a `transfer` could be used instead so approvals can be avoided.

```
transferFrom
RNM
NFTRegistry
transfer
```

Recommendation

Consider using the `transfer` function if the RNM token allows it.

```
transfer
```

Resolution

Pending resolution.

L-2 | Validation Upon Name Transfer

CATEGORY	SEVERITY	LOCATION	STATUS
Best Practices	LOW	NFTRegistry.sol: 172	Acknowledged

Description

`transferName` can potentially lead to an NFT's name being overwritten without permission from the holder. There must be proper validation done by the marketplace to make sure people can't arbitrarily send names to another person's NFT.

```
transferName
```

Recommendation

Ensure the marketplace contract has the necessary validation checks in place to only transfer a name if the to address acknowledges the transaction whether it is through a name purchase or some other means.

Resolution

Pending resolution.

L-3 | Zero Address Checks

CATEGORY	SEVERITY	LOCATION	STATUS
Best Practices	LOW	NFTRegistry.sol: 93	Resolved

Description

The constructor can benefit from zero address checks to help prevent errors during deployment.

Recommendation

Focus on creating seamless deploy scripts and consider adding zero address checks

Resolution

Pending resolution.

L-4 | Unnecessary Boolean Checks

CATEGORY	SEVERITY	LOCATION	STATUS
Optimization	LOW	NFTRegistry.sol	Resolved

Description

The contract frequently performs `variable == true` or `variable == false` which is unnecessary and gas inefficient.

```
variable == true
variable == false
```

Recommendation

Replace `require(variable == true)` with `require(variable)`.

```
require(variable == true)
require(variable)
```

Resolution

Pending resolution.

L-5 | Unnecessary Casting

CATEGORY	SEVERITY	LOCATION	STATUS
Optimization	LOW	NFTRegistry.sol	Resolved

Description

There is no need to cast `holdFarmingAddress` to the `IHoldFarming` interface in functions such as `curateCollection` as it was already declared with the `IHoldFarming` type. The variable was not cast in `initiateRetroactiveHoldFarming`.

```
holdFarmingAddress
IHoldFarming
curateCollection
IHoldFarming
initiateRetroactiveHoldFarming
```

Recommendation

Consider removing the explicit casts to save gas.

Resolution

Pending resolution.

L-6 | Typo

CATEGORY	SEVERITY	LOCATION	STATUS
Typo	LOW	NFTRegistry.sol: 44	Resolved

Description

“Naiming” is misspelled in the comment.

Recommendation

Correct the spelling for cleaner docs.

Resolution

Pending resolution.

Summary of Recommendations

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

Priority Matrix

ISSUE ID	TITLE	SEVERITY	PRIORITY
M-0	Hold Farming Naming Not Free	MEDIUM	Medium
M-2	Lost Names With Burnable NFT	MEDIUM	Medium
M-1	Potential DoS	LOW	Low
L-0	Simpler Code	LOW	Low
L-1	Transfer vs TransferFrom	LOW	Low
L-2	Validation Upon Name Transfer	LOW	Low
L-3	Zero Address Checks	LOW	Low
L-4	Unnecessary Boolean Checks	LOW	Low
L-5	Unnecessary Casting	LOW	Low
L-6	Typo	LOW	Low

General Security Best Practices

- ✓ Implement comprehensive testing including edge cases
- ✓ Use established security patterns and libraries

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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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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