Smart Contract Audit Report

Baseline-Updates

Audit Performed By

Fortknox Security

Professional Smart Contract Auditing

July 6, 2024

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Executive Summary

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

8	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 Baseline-Updates smart contract audit reveals **8 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	Baseline-Updates
Total Issues Found	8
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 Baseline-Updates.

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 | Invalid Portion Burned

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	HIGH	AfterBurner.sol: 174	Resolved

Description

In the reheat function the `reserveSize` is computed with a denominator of 100e18, however the `minPortion` and `maxPortion` are assigned to as .05 ether and .15 ether respectively in the constructor.

```
reserveSize
minPortion
maxPortion
```

Recommendation

Use a denominator of 1e18 rather than 100e18.

Resolution

Baseline Team: Resolved.

M-0 | claimed Value Not Assigned

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	YesArena.sol: 80	Acknowledged

Description

In the `claim` function the `claimed` boolean is not assigned to `true`, therefore the system never indicates that the claim can occur.

```
claim
claimed
true
```

Recommendation

Assign the `claimed` boolean to true in the `claim` function.

```
claimed
claim
```

Resolution

Baseline Team: Resolved.

M-1 | Blast Yields Are Not Configured For YesArena

CATEGORY	SEVERITY	LOCATION	STATUS
Configuration	MEDIUM	YesArena.sol	Resolved

Description

In the YesArena contract there is no configuration for gas yields, however the YesArena contract is likely to accrue a nontrivial gas expenditure during the game.

Recommendation

Consider implementing appropriate configurations and functions to claim the gas yields that would accrue for the YesArena contract.

Resolution

Baseline Team: Resolved.

M-2 | Lacking _buy Slippage Protection

CATEGORY	SEVERITY	LOCATION	STATUS
Sandwhich Attack	MEDIUM	Afterburner.sol: 209	Resolved

Description

In the _buy function there is no slippage protection configured in the swap call. This allows malicious actors to sandwich the reheat transaction's swap and extract value from the system.

Recommendation

The system is currently deployed on Blast which does not have a public mempool, so frontrunning sandwich vectors are not an immediate concern.

Resolution

Baseline Team: Resolved.

L-0 | Lack Of Upgradeability Controls

CATEGORY	SEVERITY	LOCATION	STATUS
Suggestion	LOW	AfterBurner.sol	Resolved

Description

The `mm` and `cf` addresses are declared `immutable` in the `AfterBurner` contract, however In the event that the `MarketMaking` or `CreditFacility` contracts are upgraded, a new `AfterBurner` contract would need to be deployed.

```
mm
cf
immutable
AfterBurner
MarketMaking
CreditFacility
AfterBurner
```

Recommendation

Consider implementing functions to update the cf and mm addresses, and be sure that the owner address is a multi-sig. Otherwise if trust of the owner is a concern, do not add these functions and be aware that the AfterBurner should be re-deployed with funds ported over in the event of a `MarketMaking` or `CreditFacility` contract upgrade.

```
MarketMaking
CreditFacility
```

Resolution

Baseline Team: Resolved.

L-1 | Lacking Rate Validations

CATEGORY	SEVERITY	LOCATION	STATUS
	LOW		Resolved

Description

In the `YesArena` contract constructor there is no validation that the `GROWTH_RATE` is correctly assigned to a value greater than `1e18`. If the `GROWTH_RATE` value is assigned to less than `1e18` it will result in a smaller deposit price over time.

```
YesArena
GROWTH_RATE
1e18
GROWTH_RATE
1e18
```

Recommendation

Consider implementing validations such that the `GROWTH_RATE` cannot be assigned to a value less than `1e18` and the `FEE_RATE` cannot be above a certain threshold.

```
GROWTH_RATE
1e18
FEE_RATE
```

Resolution

Baseline Team: Resolved.

L-2 | YesArena References Old AfterBurner

CATEGORY	SEVERITY	LOCATION	STATUS
Configuration	LOW	YesArena.sol: 24	Resolved

Description

In the `YesArena` contract the `afterburner` address is hardcoded as the existing afterburner contract, which does not include the latest updates.

```
YesArena
afterburner
```

Recommendation

Consider making the `afterburner` address configurable within the constructor. Otherwise be sure to update this address in the `YesArena` contract before deployment.

```
afterburner
YesArena
```

Resolution

Baseline Team: Resolved.

L-3 | Unlock Timestamp Within Game Time

CATEGORY	SEVERITY	LOCATION	STATUS
Unexpected Behavior	LOW	YesArena.sol: 108	Resolved

Description

The `UNLOCK_TIMESTAMP` may occur within the `gameTime` period if enough deposits are made, as a result the winner will be able to claim the jackpot immediately after winning.

```
UNLOCK_TIMESTAMP
gameTime
```

Recommendation

Consider if this is expected behavior, if it is not then consider altering the unlock time validation such that it validates that a certain amount of time has passed since the end of the game time period.

Resolution

Baseline Team: Resolved.

Summary of Recommendations

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

Priority Matrix

ISSUE ID	TITLE	SEVERITY	PRIORITY
H-0	Invalid Portion Burned	HIGH	High
M-0	claimed Value Not Assigned	MEDIUM	Medium
M-1	Blast Yields Are Not Configured For YesArena	MEDIUM	Medium
M-2	Lacking _buy Slippage Protection	MEDIUM	Medium
L-0	Lack Of Upgradeability Controls	LOW	Low
L-1	Lacking Rate Validations	LOW	Low
L-2	YesArena References Old AfterBurner	LOW	Low
L-3	Unlock Timestamp Within Game Time	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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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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