Smart Contract Audit Report

PleasrDAO

Audit Performed By

Fortknox Security

Professional Smart Contract Auditing

February 27, 2024

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Executive Summary

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

9	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 PleasrDAO smart contract audit reveals **9 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	PleasrDAO
Total Issues Found	9
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 PleasrDAO.

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 | Missing onlyLive Modifier

CATEGORY	SEVERITY	LOCATION	STATUS
Access Control	HIGH	Token.sol: 173	Resolved

Description

The `purchaseWithUSDC` function lacks an `onlyLive` modifier, therefore mints can still occur with USDC as a payment token when the contract is disabled.

```
purchaseWithUSDC
onlyLive
```

Recommendation

Add an `onlyLive` modifier to the `purchaseWithUSDC` function.

```
onlyLive
purchaseWithUSDC
```

Resolution

PleasrDAO Team: The issue was resolved

M-0 | NFT Marketplaces Will Not Read Royalty Info

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	Global	Resolved

Description

The Token contract implements the ERC2981 standard to signal royalty fees to be taken when NFT sales are made on NFT marketplaces. However the Token contract is the ERC20 compatible contract, not the ERC721 compatible contract, therefore NFT exchanges which will interact with the `DN404Mirror` contract will not read the `royaltyRecipient` and `royaltyFee` that are configured in the Token contract.

```
DN404Mirror
royaltyRecipient
royaltyFee
```

Recommendation

Create a contract which inherits `DN404Mirror` and implements the ERC2981 standard with the royalty configurations. Consider adding a function to update the bps for future-proofing.

```
DN404Mirror
```

Resolution

PleasrDAO Team: The issue was resolved

M-1 | contractURI Metadata Is Not Queryable From ERC721 Mirror

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	MEDIUM	Token.sol: 253	Resolved

Description

The `Token` contract implements a `contractURI` function which is intended to include collection level metadata about the ERC721 counterpart of the DN404 pair.

```
Token
contractURI
```

Recommendation

Create a contract which inherits from the `DN404Mirror` contract and adds a `contractURI` function which uses `_readString` to query the DN404 base contract, similar to the `tokenURI` function. Then override the `dn404Fallback` function to add the corresponding selector functionality for a `_contractURI` function.

```
DN404Mirror
contractURI
_readString
tokenURI
dn404Fallback
_contractURI
```

Resolution

PleasrDAO Team: The issue was resolved

M-2 | Circumvented Token Transfer Restrictions

CATEGORY	SEVERITY	LOCATION	STATUS
Validation	MEDIUM	Token.sol: 362	Resolved

Description

ERC20 tokens are non transferable when the contract is deployed. This is enforced with the `transferable` flag, preventing `_transfer` and `_transferFromNFT` to be executed when the from address is not the zero address, to allow token minting.

```
transferable
_transfer
_transferFromNFT
```

Recommendation

Consider overriding the DN404 `transferFrom` function to add the zero address check on the `from` address.

```
transferFrom
from
```

Resolution

PleasrDAO Team: The issue was resolved

L-0 | Excess ETH Not Refunded

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	LOW	Token.sol: 133	Acknowledged

Description

Users can purchase NFTs with ETH or USDC, where `purchase()` is a payable function in charge of receiving ETH for tokens. It validates if a user has sent enough funds with the `checkPrice` modifier. In case a user sends more ETH than the NFT value, these funds will not be refunded, and will be sent to the `fundsRecipient` instead.

```
purchase()
checkPrice
fundsRecipient
```

Recommendation

Consider adding a refund function where the excess ETH is first sent to the user and the remaining sent to the funds recipient.

Resolution

PleasrDAO Team: Acknowledged.

L-1 | USDC Token Purchase DoS'ed By Blacklisted fundsRecipient

CATEGORY	SEVERITY	LOCATION	STATUS
DoS	LOW	Token.sol: L179	Acknowledged

Description

User purchasing tokens with USDC will call `purchaseWithUSDC()`. This function will collect the USDC from the user and transfer it to the `fundsRecipient`.

```
purchaseWithUSDC()
fundsRecipient
```

Recommendation

Consider adding an admin function to update the `fundsRecipient` address.

```
fundsRecipient
```

Resolution

PleasrDAO Team: Acknowledged.

L-2 | reduceIntervals Lacking Input Validation

CATEGORY	SEVERITY	LOCATION	STATUS
Validation	LOW	Token.sol:: 199	Resolved

Description

`reduceIntervals()` is an important admin function used to reduce intervals without minting NFTs. The initial number of intervals is estimated at 2.1 mil (41 mil minutes / 20 min intervals). Given this large number, admin input error is possible when trying to reduce the number of intervals.

```
reduceIntervals()
```

Recommendation

Consider some form of input validation, for example by adding a `max interval amount` check.

```
max interval amount
```

Resolution

PleasrDAO Team: The issue was resolved.

L-3 | tokenURI Fields Not Fully Configurable

CATEGORY	SEVERITY	LOCATION	STATUS
Logical Error	LOW	Token.sol: 219	Acknowledged

Description

The specification document states that update of `tokenURI` metadata is a mandatory feature. While there is a `setMedia` function implemented, it does not allow for all `tokenConfig` fields to be updated.

```
tokenURI
setMedia
tokenConfig
```

Recommendation

Allow `setMedia` to configure all of `tokenConfig` fields.

```
setMedia
tokenConfig
```

Resolution

PleasrDAO Team: Acknowledged.

L-4 | Lack Of Indexed Parameter In Event

CATEGORY	SEVERITY	LOCATION	STATUS
Events	LOW	Token.sol: 17	Acknowledged

Description

The `Minted` event lacks an indexed parameter for `to` address, so off-chain services will not be able to filter them by user address.

```
Minted
to
```

Recommendation

Add the indexed `to` parameter:

```
to
```

Resolution

PleasrDAO Team: Acknowledged.

Summary of Recommendations

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

Priority Matrix

ISSUE ID	TITLE	SEVERITY	PRIORITY
H-0	Missing onlyLive Modifier	HIGH	High
M-0	NFT Marketplaces Will Not Read Royalty Info	MEDIUM	Medium
M-1	contractURI Metadata Is Not Queryable From ERC721 Mirror	MEDIUM	Medium
M-2	Circumvented Token Transfer Restrictions	MEDIUM	Medium
L-0	Excess ETH Not Refunded	LOW	Low
L-1	USDC Token Purchase DoS'ed By Blacklisted fundsRecipient	LOW	Low
L-2	reduceIntervals Lacking Input Validation	LOW	Low
L-3	tokenURI Fields Not Fully Configurable	LOW	Low
L-4	Lack Of Indexed Parameter In Event	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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