



ENTERSOFT

Smart Contract Security Audit Report

Prepared for:

Ikon Media (Jetcoin)

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By:

Entersoft Security



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1 Disclaimer

This is a limited audit report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to: (i) smart contract best coding practices and vulnerabilities in the framework and algorithms based on white paper, code, the details of which are set out in this report, (Smart Contract audit). In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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The analysis of the Smart contract is purely based on the smart contract code shared with us alone.

2 Background

Entersoft was commissioned by Ikon Media (hereinafter referred to as Jetcoin) to perform source code review on their solidity smart contract. The review was conducted between 29th January 2021 to 12th February 2021.

The report is organized into the following sections.

- **Executive Summary:** A high-level overview of the security audit findings.
- **Technical analysis:** Our detailed analysis of the Smart Contract code

The information in this report should be used to understand overall code quality, security, correctness, and meaning that code will work as Jetcoin describe in the smart contract. The analysis is static and entirely limited to Smart contract code.

The following files were reviewed as part of the scope:

<https://github.com/VexyCats/JetCoinNFTs/commit/71af4309accbc02b60c5510d86f69ac6bacd2d9>

3 Executive Summary

Jetcoin connects athletes, teams, fans to social media and brands using blockchain technology to promote commercial contracts, image rights and fan base worldwide seamlessly.

In the audit, we have reviewed the smart contract's code that implements the token mechanism. The following files are considered predominantly under review:

- <https://github.com/VexyCats/JetCoinNFTs/commit/71af4309accbc02b60c5510d86f69ac6bacd2d9>
 - JetCoinNFT
 - Jet-Coin-master/contracts
 - EnumerableMap
 - IERC721Metadata
 - Context
 - Strings
 - ERC721
 - AccessControl
 - IERC721Receiver

Scope

We have provided an independent technical audit to remove smart contract uncertainties and to keep it safe from any serious hacks. Smart contract audit keeps clients protected from any fraudulent activity. The audit was performed both manually and using automated tools. We have analyzed the smart contract code line by line and reported any suspicious code. After manual analysis, we have utilized automated tools to make sure the coverage is thorough.

We have considered the following Standards for the Smart contract code review:

1. ERC20 [Token Contract best practices]

We worked with the following tools to perform Automated tests:

1. **Automated Testing tools**
 - 1.1 Ganache
 - 1.2 Truffel
 - 1.3 Truffle Team
2. **Manual Testing tools**
 - 2.1 Remix
 - 2.2 Ropsten Test Network
 - 2.3 Slither
3. **Code quality checking using linter**
 - 3.1 Solhint
 - 3.2 Surya

Auditing Approach and Methodologies applied

The Entersoft team has performed thorough testing of the project starting with analyzing the code design patterns in which we reviewed the smart contract architecture to ensure it is structured securely with the safe use of third-party smart contracts and libraries.

Our team then performed a formal line by line inspection of the code of the Smart Contract to find any potential issues such as race conditions, transaction-ordering dependence, timestamp dependence, and denial of service attacks.

In the Unit testing phase, we coded/conducted custom unit tests written for each function in the contract to verify that each function works as expected. In Automated Testing, we tested the Smart Contract with our in-house developed tools to identify vulnerabilities and security flaws.

The code audits included:

1. Testing the functionality of the Smart Contract to determine proper logic has been followed throughout the process.
2. Analyzing the complexity of the code by thorough line-by-line manual review of the code.
3. Deploying the code on test net and using multiple clients to run live tests
4. Analyzing failure preparations to check how the Smart Contract performs in case of bugs and vulnerabilities.
5. Checking whether all the libraries used in the code are on the latest versions.
6. Analyzing the security of the on-chain data.

Audit Goals

The focus of the audit was to verify that the smart contract system is secure, resilient and working according to its specifications that has been provided to the Auditing team. The audit activities can be grouped in the following three categories:

- **Security**: Identifying security related vulnerabilities within each contract and the system of contracts.
- **Sound Architecture**: Evaluation of the architecture of this system through the lens of established smart contract best practices and general software best practices.
- **Code Correctness and Quality**: A full review of the contract source code. The primary areas of focus include:
 - Correctness
 - Readability
 - Sections of code with high complexity
 - Quantity and quality of test coverage

Result

Audit was conducted on the provided three contract files. The following table provides an overall picture of the security posture. ✓ means no bugs are identified.

| # | SMART CONTRACT PENETRATION TEST OBJECTIVES | AUDIT SUBCLASS | RESULT |
|---------------------------------|--|--------------------------------|---------------|
| 1 | OVERFLOW | - | ✓ |
| 2 | RACE CONDITION | - | ✓ |
| 3 | PERMISSIONS | Permission vulnerability Audit | ✓ |
| 4 | SAFETY DESIGN | - | ✓ |
| 5 | DDOS ATTACK | Excessive Auditing Authority | ✓ |
| 6 | GAS OPTIMIZATION | Zeppelin safe math | ✓ |
| 7 | DESIGN LOGIC | Call function security | ✓ |
| 8 | KNOW ATTACKS | - | ✓ |
| OVERALL SECURITY POSTURE | | | Secure |

Recommendations

Use case of the smart contract is very well designed and Implemented. Overall, the code is written and demonstrates effective use of abstraction, separation of concerns, and modularity. Jetcoin development team demonstrated high technical capabilities, both in the design of the architecture and in the implementation.

All the bugs, suggestions and recommends has been considered by Jetcoin team and some of the issues they will handle to their own as those issues or calls have been handle by the only owner,

Code quality

The code quality is of high standard, and we believe it is professionally written along with high quality neat code. There is enough documentation for each function.

Code security

A static analysis of the code is performed to identify any loopholes in the Smart contract code. Also, to verify whether the contracts adhere to the Solidity Best Practices.

Security Level references

Every issue in this report was assigned a severity level from the following:

High severity issues:

The issue puts the vast majority of, or large numbers of, users' sensitive information at risk, or is reasonably likely to lead to catastrophic impact for client's reputation or serious financial implications for client and users.

Medium severity issues:

The issue puts a subset of individual users' sensitive information is at risk, exploitation would be detrimental for the client's reputation, or is reasonably likely to lead to moderate financial impact.

Low severity issues:

The risk is relatively small and could not be exploited on a recurring basis or is a risk the client has indicated is not important or impactful in view of the client's business circumstances.

Informational:

The issue does not pose an immediate threat to continued operation or usage, but is relevant for security best practices, software engineering best practices, or defensive redundancy.

Number of Vulnerabilities per severity

| HIGH | MEDIUM | LOW | INFO |
|------|--------|-----|------|
| 0 | 0 | 0 | 4 |

High severity Vulnerabilities:

- No High Severity Vulnerabilities.

Medium Severity Vulnerabilities:

- No Medium Severity Vulnerabilities.

Low Severity Vulnerabilities:

- No Medium Severity Vulnerabilities.

Informational:

| Severity | Informational |
|-----------------------|---|
| Description | Unsuitable function declaration |
| Code | <p>AccessControl.sol</p> <p>getRoleMemberCount(bytes32) should be declared external: - AccessControl.getRoleMemberCount(bytes32) (AccessControl.sol#435-437)</p> <p>getRoleMember (bytes32, uint256) should be declared external: - AccessControl.getRoleMember(bytes32, uint256) (AccessControl.sol#451-453)</p> <p>getRoleAdmin(bytes32) should be declared external: - AccessControl.getRoleAdmin(bytes32) (AccessControl.sol#461-463)</p> <p>grantRole (bytes32, address) should be declared external: - AccessControl.grantRole(bytes32, address) (AccessControl.sol#475-479)</p> <p>revokeRole (bytes32, address) should be declared external: - AccessControl.revokeRole(bytes32, address) (AccessControl.sol#490-494)</p> <p>renounceRole (bytes32, address) should be declared external: - AccessControl.renounceRole(bytes32, address) (AccessControl.sol#510-514)</p> |
| Recommendation | Use the 'external' attribute for functions never called from the contract. |
| Status | Not Fixed |

| | |
|-----------------------|--|
| Severity | Informational |
| Description | Unused function parameter. |
| Code | <p>AccessControl.sol</p> <ul style="list-style-type: none"> functionCallWithValue(address target, bytes memory data, uint256 value, string memory errorMessage) internal returns (bytes memory) <p>Address.sol:89:52</p> <ul style="list-style-type: none"> functionCallWithValue(address target, bytes memory data, uint256 value, string memory errorMessage) internal returns (bytes memory) <p>Address.sol:89:86</p> <ul style="list-style-type: none"> functionCallWithValue(address target, bytes memory data, uint256 value, string memory errorMessage) internal returns (bytes memory) <p>Address.sol:89:5</p> <ul style="list-style-type: none"> functionCallWithValue(address target, bytes memory data, uint256 value, string memory errorMessage) internal returns (bytes memory) |
| Recommendation | Remove or comment out the variable name to silence this warning. |
| Status | Not Fixed |

| | |
|-----------------------|--|
| Severity | Informational |
| Description | Unsuitable function declaration |
| Code | -ERC165.supportsInterface(bytes4) (ERC165.sol#35-37) |
| Recommendation | supportsInterface(bytes4) should be declared external. |
| Status | Not Fixed |

| | |
|-----------------------|--|
| Severity | Informational |
| Description | The Function order is incorrect based on the standard of the coding style. |
| Code | |
| Recommendation | It should be based on this style guide: https://docs.soliditylang.org/en/v0.4.24/style-guide.html |
| Status | Not Fixed |

4. Technical Analysis

The following is our technical automated and manual analysis of the Smart contract code created and used by Ikon Media.

Checked Vulnerabilities

We have checked Ikon Media Jetcoin smart contract for commonly known as well as specific business logic vulnerabilities. Following are the list of vulnerabilities tested in the smart contract code

- Reentrancy
- Timestamp Dependence
- Gas Limit and Loops
- DoS with (Unexpected) Throw
- DOS with (Unexpected) revert
- DoS with Block Gas Limit
- Transaction-Ordering Dependence
- Use of tx.origin
- Exception disorder
- Gasless send
- Balance equality
- Byte array
- Transfer forwards all gas
- ERC20 API violation
- Malicious libraries
- Compiler version not fixed
- Redundant fallback function
- Send instead of transfer
- Style guide violation
- Unchecked external call
- Unchecked math
- Unsafe type inference
- Implicit visibility level
- Address hardcoded
- Using delete for arrays
- Integer overflow/underflow
- Locked money
- Private modifier
- Revert/require functions
- Using var
- Visibility

Unit Testing - Test Suite

Contract: Jetcoin Token Contracts

- ✓ Should correctly deploy JET contract
- ✓ Should check a name of a token of jet
- ✓ Should check a symbol of a token jet
- ✓ Should check a owner of a token (61ms)
- ✓ Should check a balance of a token contract
- ✓ Should check a balance of a owner (73ms)
- ✓ Should check the total supply of a token contract
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4
- ✓ should Approve accounts[1] to spend specific tokens of accounts[4]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (42ms)
- ✓ should increase Approve accounts[4] to spend specific tokens of accounts[1]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (38ms)
- ✓ should decrease Approve accounts[4] to spend specific tokens of accounts[1]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (58ms)
- ✓ should decrease Approve accounts[4] to spend specific tokens of accounts[1]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (50ms)
- ✓ should Approve accounts[1] to spend specific tokens of accounts[4] agin
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (46ms)
- ✓ should be able to transferfrom accounts[4] to accounts[1]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (50ms)
- ✓ Should check a balance of a beneficiary of accounts[4] after sending all tokens
- ✓ Should check a balance of a receiver accounts[1]
- ✓ Should check a owner of a token before transferring ownership
- ✓ Should not be able to transfer ownership before
- ✓ Should be able to transfer ownership before
- ✓ Should be able to accept transfer ownership before (39ms)
- ✓ Should check a owner of a token after transferring ownership
- ✓ Should be able to transfer ownership again to accounts[0] (39ms)
- ✓ Should be able to accept transfer ownership before (41ms)

- ✓ Should check a owner of a token after transferring ownership
- ✓ Should check a balance of a accounts[6]
- ✓ should check approval by accounts 5 to accounts 6 to spend locked tokens on the behalf of accounts 5
- ✓ should Approve accounts[1] to spend specific tokens of accounts[4]
- ✓ should check approval by accounts 4 to accounts 1 to spend tokens on the behalf of accounts 4 (40ms)

Result of Test:

79 PASSED.

0 FAILED.



Automation Tool testing: Slither, Mythril, Echidna, Manticore

```

INFO:Detectors:
Pragma version0.5.16 (EnumerableMap.sol#3) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Slither:EnumerableMap.sol analyzed (1 contracts with 46 detectors), 1 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
abh@crypticocean:~/Projects/NFTAudit/JetCoinNFTs/contracts$ slither EnumerableSet.sol
INFO:Detectors:
Pragma version0.5.16 (EnumerableSet.sol#3) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Slither:EnumerableSet.sol analyzed (1 contracts with 46 detectors), 1 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
abh@crypticocean:~/Projects/NFTAudit/JetCoinNFTs/contracts$ slither ERC165.sol
INFO:Detectors:
Different versions of Solidity is used in :
- Version used: ['0.5.16', '^0.5.16']
- 0.5.16 (ERC165.sol#3)
- ^0.5.16 (ERC165.sol#1)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#different-pragma-directives-are-used
INFO:Detectors:
Pragma version0.5.16 (ERC165.sol#3) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Pragma version^0.5.16 (IERC165.sol#1) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Detectors:
supportsInterface(bytes4) should be declared external:
- ERC165.supportsInterface(bytes4) (ERC165.sol#35-37)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#public-function-that-could-be-declared-as-external
INFO:Slither:ERC165.sol analyzed (2 contracts with 46 detectors), 4 result(s) found
-----
INFO:Detectors:
Address.isContract(address) (Address.sol#24-33) uses assembly
- INLINE ASM None (Address.sol#31)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#assembly-usage
INFO:Detectors:
Pragma version0.5.16 (Address.sol#1) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Slither:Address.sol analyzed (1 contracts with 46 detectors), 2 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
abh@crypticocean:~/Projects/NFTAudit/JetCoinNFTs/contracts$ slither Context.sol
INFO:Detectors:
Pragma version0.5.16 (Context.sol#3) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Slither:Context.sol analyzed (1 contracts with 46 detectors), 1 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
abh@crypticocean:~/Projects/NFTAudit/JetCoinNFTs/contracts$ slither IERC721Enumerable.sol
Compilation warnings/errors on IERC721Enumerable.sol:
-----
INFO:Detectors:
Address.isContract(address) (AccessControl.sol#24-33) uses assembly
- INLINE ASM None (AccessControl.sol#31)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#assembly-usage
INFO:Detectors:
Pragma version0.5.16 (AccessControl.sol#1) necessitates versions too recent to be trusted. Consider deploying with 0.5.11
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Detectors:
getRoleMemberCount(bytes32) should be declared external:
- AccessControl.getRoleMemberCount(bytes32) (AccessControl.sol#435-437)
getRoleMember(bytes32,uint256) should be declared external:
- AccessControl.getRoleMember(bytes32,uint256) (AccessControl.sol#451-453)
getRoleAdmin(bytes32) should be declared external:
- AccessControl.getRoleAdmin(bytes32) (AccessControl.sol#461-463)
grantRole(bytes32,address) should be declared external:
- AccessControl.grantRole(bytes32,address) (AccessControl.sol#475-479)
revokeRole(bytes32,address) should be declared external:
- AccessControl.revokeRole(bytes32,address) (AccessControl.sol#490-494)
renounceRole(bytes32,address) should be declared external:
- AccessControl.renounceRole(bytes32,address) (AccessControl.sol#510-514)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#public-function-that-could-be-declared-as-external
INFO:Slither:AccessControl.sol analyzed (1 contracts with 46 detectors), 8 result(s) found

```

Implementation Recommendations:

- `getRoleMemberCount(bytes32)` should be declared external:
 - `AccessControl.getRoleMemberCount(bytes32)` (AccessControl.sol#435-437)
- `getRoleMember(bytes32,uint256)` should be declared external:
 - `AccessControl.getRoleMember(bytes32,uint256)` (AccessControl.sol#451-453)
- `getRoleAdmin(bytes32)` should be declared external:
 - `AccessControl.getRoleAdmin(bytes32)` (AccessControl.sol#461-463)
- `grantRole(bytes32,address)` should be declared external:
 - `AccessControl.grantRole(bytes32,address)` (AccessControl.sol#475-479)
- `revokeRole(bytes32,address)` should be declared external:
 - `AccessControl.revokeRole(bytes32,address)` (AccessControl.sol#490-494)
- `renounceRole(bytes32,address)` should be declared external:
 - `AccessControl.renounceRole(bytes32,address)` (AccessControl.sol#510-514)

5 Limitations on Disclosure and Use of this Report.

This report contains information concerning potential details of Ikon Media and methods for exploiting them. Entersoft recommends that special precautions be taken to protect the confidentiality of both this document and the information contained herein.

Security Assessment is an uncertain process, based on past experiences, currently available information, and known threats. All information security systems, which by their nature are dependent on human beings, are vulnerable to some degree. Therefore, while Entersoft considers the major security vulnerabilities of the analyzed systems to have been identified, there can be no assurance that any exercise of this nature will identify all possible vulnerabilities or propose exhaustive and operationally viable recommendations to mitigate those exposures.

In addition, the analysis set forth herein is based on the technologies and known threats as of the date of this report. As technologies and risks change over time, the vulnerabilities associated with the operation of the Ikon Media Jetcoin Smart Contract described in this report, as well as the actions necessary to reduce the exposure to such vulnerabilities will also change. Entersoft makes no undertaking to supplement or update this report based on changed circumstances or facts of which Entersoft becomes aware after the date hereof, absent a specific written agreement to perform the supplemental or updated analysis.

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