Cyberscope

# Audit Report

# MoonLabsStakingCards

March 2023

SHA256 fdac7fa4e7374b7b2b7ff4ba7903c23ef0c5b01e9482101ad16288388102a243

Audited by © cyberscope

# Table of Contents

# Review

| | |
|---|---|
| **Contract Name** | MoonLabsStakingCards |
| **Testing Deploy** | https://testnet.bscscan.com/address/0x7e880151b52d2d95a5b3d854cb59ecd0cfdfbe1c |
| **Symbol** | TST |

## Audit Updates

| | |
|---|---|
| **Initial Audit** | 24 Mar 2023 |

# Source Files

| Filename | SHA256 |
|---|---|
| **@openzeppelin/contracts/access/Ownable.sol** | 9353af89436556f7ba8abb3f37a6677249aa4df6024fbfaa94f79ab2f44f3231 |
| **@openzeppelin/contracts/token/ERC721/ERC721.sol** | d0ae06bbac0c133b7891194ae955f624473d8572a7c6928747599f4043b01c04 |
| **@openzeppelin/contracts/token/ERC721/extensions/ERC721Enumerable.sol** | e09a099c8828bb8eb545968ecca3f5f0fe418618eabd93b40befd6ec7e5a88be |
| **@openzeppelin/contracts/token/ERC721/extensions/IERC721Enumerable.sol** | ec7cb6a8cc0fdad9e3a707146b503d976595a880d24d62c99565787593f3660b |
| **@openzeppelin/contracts/token/ERC721/extensions/IERC721Metadata.sol** | f16b861aa1f623ccc5e173f1a82d8cf45b678a7fb81e05478fd17eb2ccb7b37e |
| **@openzeppelin/contracts/token/ERC721/IERC721.sol** | c7703068bac02fe1cdf109e38faf10399c66eb411e4c9ae0d70c009eca4bf5ef |
| **@openzeppelin/contracts/token/ERC721/IERC721Receiver.sol** | 77f0f7340c2da6bb9edbc90ab6e7d3eb8e2ae18194791b827a3e8c0b11a09b43 |
| **@openzeppelin/contracts/utils/Address.sol** | 8160a4242e8a7d487d940814e5279d934e81f0436689132a4e73394bab084a6d |
| **@openzeppelin/contracts/utils/Context.sol** | 1458c260d010a08e4c20a4a517882259a23a4baa0b5bd9add9fb6d6a1549814a |
| **@openzeppelin/contracts/utils/introspection/ERC165.sol** | 8806a632d7b656cadb8133ff8f2acae4405b3a64d8709d93b0fa6a216a8a6154 |
| **@openzeppelin/contracts/utils/introspection/IERC165.sol** | 701e025d13ec6be09ae892eb029cd83b3064325801d73654847a5fb11c58b1e5 |
| **@openzeppelin/contracts/utils/math/Math.sol** | 8059d642ec219d0b9b62fbc76912079529cf494cac988abe5e371f1168b29b0f |
| **@openzeppelin/contracts/utils/Strings.sol** | f81f11dca62dcd3e0895e680559676f4ba4f2e12a36bb0291d7ecbb6b983141f |

| | |
|---|---|
| **contracts/MoonLabsStakingCards.sol** | fdac7fa4e7374b7b2b7ff4ba7903c23ef0c5b01e9482101ad16288388102a243 |

# Introduction

The MoonLabsStakingCards contract extends ERC721Enumerable and Ownable contracts from the OpenZeppelin library. It allows for the creation and management of non-fungible tokens (NFTs). The contract has a maximum supply of 500 NFTs, which can be minted by the contract owner only. The contract also provides a function for getting all the token IDs owned by a particular address, setting the base token URI, and claiming all ETH held in the contract. The tokenURI function returns the compiled token URI for a given token ID.

# Roles

The contract consists of the owner role. The owner is responsible for the base URI configuration and for minting tokens.

# Diagnostics

Critical Medium Minor / Informative

| Severity | Code | Description | Status |
|---|---|---|---|
| ● | MT | Mints Tokens | Unresolved |
| ● | L02 | State Variables could be Declared Constant | Unresolved |
| ● | L04 | Conformance to Solidity Naming Conventions | Unresolved |
| ● | L14 | Uninitialized Variables in Local Scope | Unresolved |

# MT - Mints Tokens

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | MoonLabsStakingCards.sol#L50 |
| **Status** | Unresolved |

## Description

The contract owner has the authority to mint tokens.

```
function ownerMint(address _to, uint amount) external onlyOwner {
  uint supply = totalSupply();
  require(supply + amount <= maxSupply, "Max supply reached");
  for (uint i = 1; i <= amount; i++) {
    _safeMint(_to, supply + i);
  }
}
```

## Recommendation

The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.
- Renouncing the ownership will eliminate the threats but it is non-reversible.

# L02 - State Variables could be Declared Constant

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | MoonLabsStakingCards.sol#L19,20 |
| **Status** | Unresolved |

## Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
string public baseExtension = ".json"
uint public maxSupply = 500
```

## Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.

# L04 - Conformance to Solidity Naming Conventions

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | MoonLabsStakingCards.sol#L27,42,73 |
| **Status** | Unresolved |

## Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX_VALUE, ERROR_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
address _owner
address _to
uint _id
```

## Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.
Find more information on the Solidity documentation https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention.

# L14 - Uninitialized Variables in Local Scope

| | |
|---|---|
| **Criticality** | Minor / Informative |
| **Location** | MoonLabsStakingCards.sol#L32 |
| **Status** | Unresolved |

## Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
uint i
```

## Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

# Functions Analysis

| Contract | Type | Bases | | |
|---|---|---|---|---|
| | **Function Name** | **Visibility** | **Mutability** | **Modifiers** |
| | | | | |
| **Ownable** | Implementation | Context | | |
| | | Public | ✓ | - |
| | owner | Public | | - |
| | _checkOwner | Internal | | |
| | renounceOwnership | Public | ✓ | onlyOwner |
| | transferOwnership | Public | ✓ | onlyOwner |
| | _transferOwnership | Internal | ✓ | |
| | | | | |
| **ERC721** | Implementation | Context, ERC165, IERC721, IERC721Metadata | | |
| | | Public | ✓ | - |
| | supportsInterface | Public | | - |
| | balanceOf | Public | | - |
| | ownerOf | Public | | - |
| | name | Public | | - |
| | symbol | Public | | - |
| | tokenURI | Public | | - |
| | _baseURI | Internal | | |
| | approve | Public | ✓ | - |
| | getApproved | Public | | - |
| | setApprovalForAll | Public | ✓ | - |
| | isApprovedForAll | Public | | - |
| | transferFrom | Public | ✓ | - |

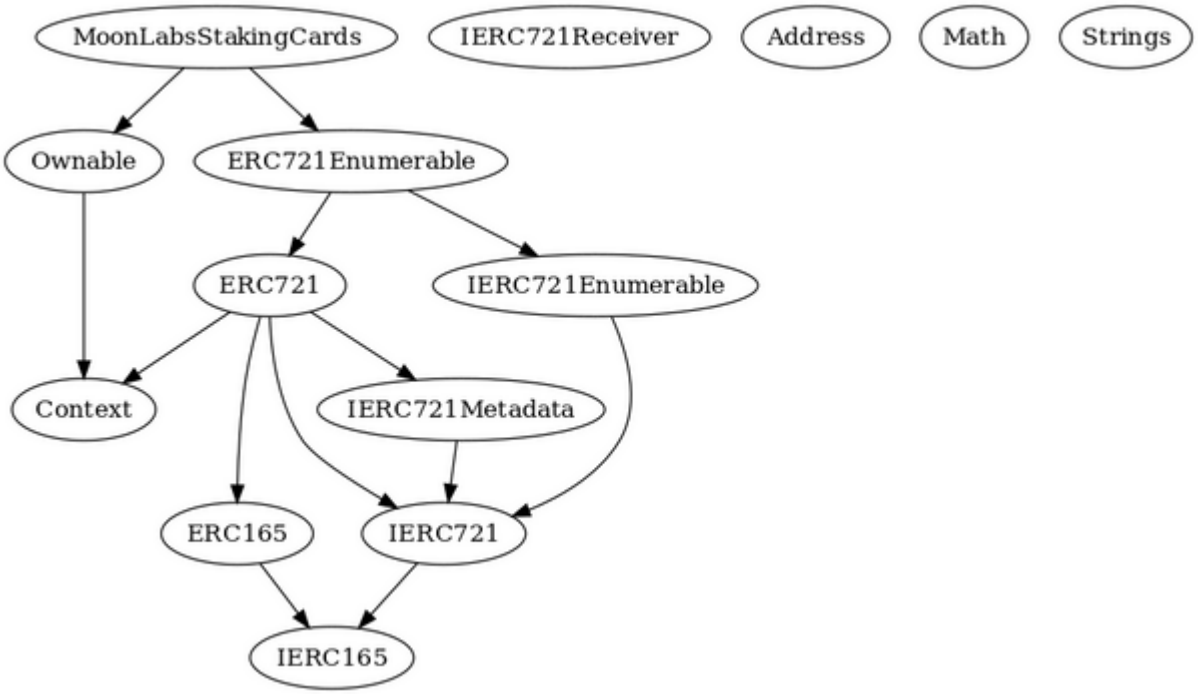
| | | | | |
|---|---|---|---|---|
| | safeTransferFrom | Public | ✓ | - |
| | safeTransferFrom | Public | ✓ | - |
| | _safeTransfer | Internal | ✓ | |
| | _ownerOf | Internal | | |
| | _exists | Internal | | |
| | _isApprovedOrOwner | Internal | | |
| | _safeMint | Internal | ✓ | |
| | _safeMint | Internal | ✓ | |
| | _mint | Internal | ✓ | |
| | _burn | Internal | ✓ | |
| | _transfer | Internal | ✓ | |
| | _approve | Internal | ✓ | |
| | _setApprovalForAll | Internal | ✓ | |
| | _requireMinted | Internal | | |
| | _checkOnERC721Received | Private | ✓ | |
| | _beforeTokenTransfer | Internal | ✓ | |
| | _afterTokenTransfer | Internal | ✓ | |
| | __unsafe_increaseBalance | Internal | ✓ | |
| | | | | |
| **ERC721Enumerable** | Implementation | ERC721, IERC721Enumerable | | |
| | supportsInterface | Public | | - |
| | tokenOfOwnerByIndex | Public | | - |
| | totalSupply | Public | | - |
| | tokenByIndex | Public | | - |
| | _beforeTokenTransfer | Internal | ✓ | |
| | _addTokenToOwnerEnumeration | Private | ✓ | |
| | _addTokenToAllTokensEnumeration | Private | ✓ | |
| | _removeTokenFromOwnerEnumeration | Private | ✓ | |

| | | | | |
|---|---|---|---|---|
| | _removeTokenFromAllTokensEnumeration | Private | ✓ | |
| | | | | |
| **IERC721Enumerable** | Interface | IERC721 | | |
| | totalSupply | External | | - |
| | tokenOfOwnerByIndex | External | | - |
| | tokenByIndex | External | | - |
| | | | | |
| **IERC721Metadata** | Interface | IERC721 | | |
| | name | External | | - |
| | symbol | External | | - |
| | tokenURI | External | | - |
| | | | | |
| **IERC721** | Interface | IERC165 | | |
| | balanceOf | External | | - |
| | ownerOf | External | | - |
| | safeTransferFrom | External | ✓ | - |
| | safeTransferFrom | External | ✓ | - |
| | transferFrom | External | ✓ | - |
| | approve | External | ✓ | - |
| | setApprovalForAll | External | ✓ | - |
| | getApproved | External | | - |
| | isApprovedForAll | External | | - |
| | | | | |
| **IERC721Receiver** | Interface | | | |
| | onERC721Received | External | ✓ | - |
| | | | | |
| **Address** | Library | | | |
| | isContract | Internal | | |

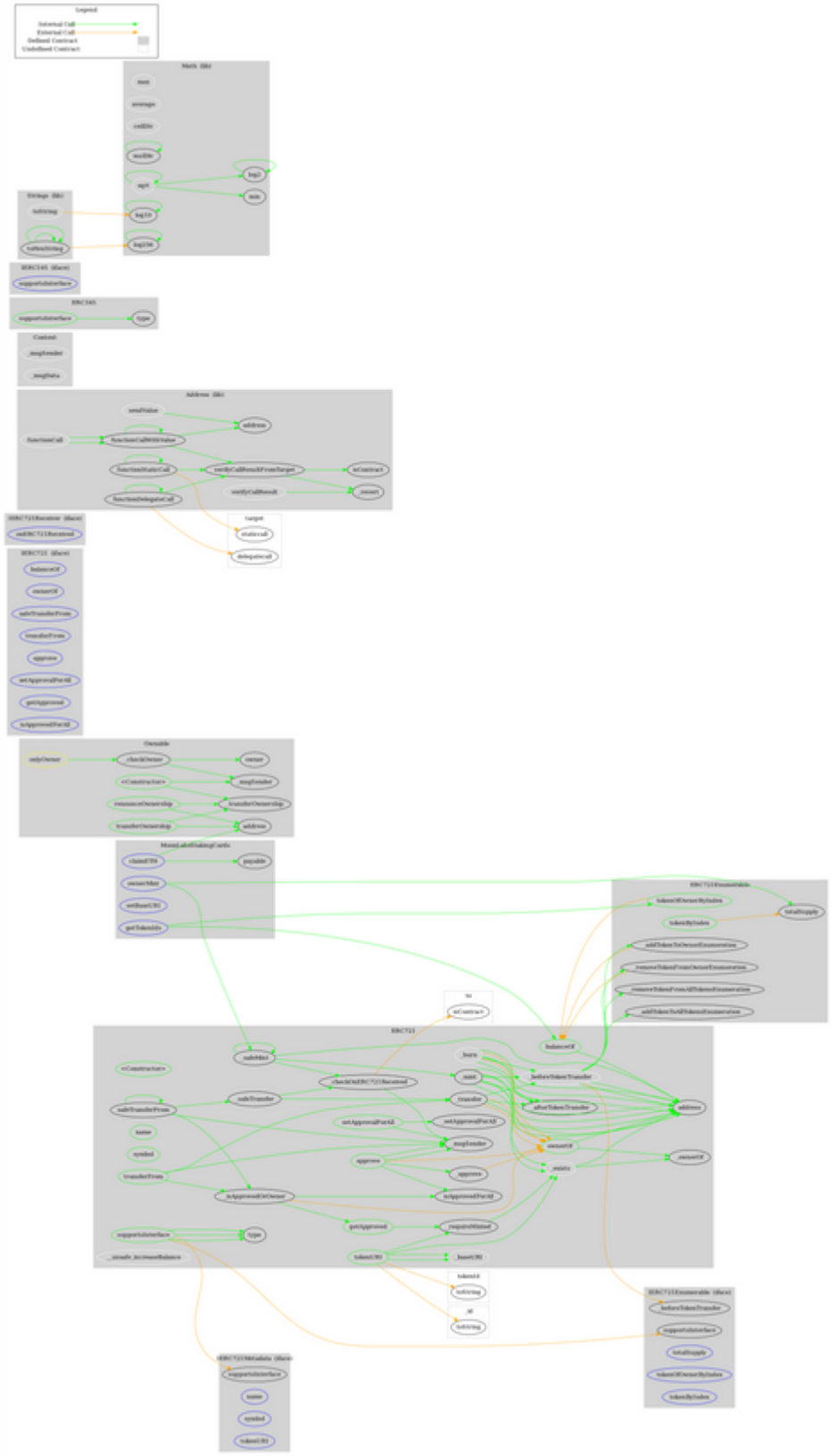
| | | | | |
|---|---|---|---|---|
| | sendValue | Internal | ✓ | |
| | functionCall | Internal | ✓ | |
| | functionCall | Internal | ✓ | |
| | functionCallWithValue | Internal | ✓ | |
| | functionCallWithValue | Internal | ✓ | |
| | functionStaticCall | Internal | | |
| | functionStaticCall | Internal | | |
| | functionDelegateCall | Internal | ✓ | |
| | functionDelegateCall | Internal | ✓ | |
| | verifyCallResultFromTarget | Internal | | |
| | verifyCallResult | Internal | | |
| | _revert | Private | | |
| | | | | |
| **Context** | Implementation | | | |
| | _msgSender | Internal | | |
| | _msgData | Internal | | |
| | | | | |
| **ERC165** | Implementation | IERC165 | | |
| | supportsInterface | Public | | - |
| | | | | |
| **IERC165** | Interface | | | |
| | supportsInterface | External | | - |
| | | | | |
| **Math** | Library | | | |
| | max | Internal | | |
| | min | Internal | | |
| | average | Internal | | |
| | ceilDiv | Internal | | |
| | mulDiv | Internal | | |

| | | | | |
|---|---|---|---|---|
| | mulDiv | Internal | | |
| | sqrt | Internal | | |
| | sqrt | Internal | | |
| | log2 | Internal | | |
| | log2 | Internal | | |
| | log10 | Internal | | |
| | log10 | Internal | | |
| | log256 | Internal | | |
| | log256 | Internal | | |
| | | | | |
| **Strings** | Library | | | |
| | toString | Internal | | |
| | toHexString | Internal | | |
| | toHexString | Internal | | |
| | toHexString | Internal | | |
| | | | | |
| **MoonLabsStakingCards** | Implementation | ERC721Enumerable, Ownable | | |
| | | Public | ✓ | ERC721 |
| | getTokenIds | External | | - |
| | ownerMint | External | ✓ | onlyOwner |
| | setBaseURI | External | ✓ | onlyOwner |
| | claimETH | External | Payable | onlyOwner |
| | tokenURI | Public | | - |
| | _baseURI | Internal | | |

# Inheritance Graph



# Flow Graph



# Summary

MoonLabsStakingCards contract implements an nft mechanism. This audit investigates security issues, business logic concerns, and potential improvements.

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The Cyberscope team

https://www.cyberscope.io