Cyberscope

# Audit Report

# CardFi

December 2022

cardFI_NFT 5c7f9e4126fd5429c8e045b794908c037c48ed31bc25c9876cf68cf91ca92843

cardFi b8774c00500b8bbde7d7e61ef5344c0c519917930aec2ff6277d4b534277a0de

Audited by © cyberscope

# Table of Contents

# Contract Review

| | |
|---|---|
| **Contract Name** | cardFi |
| **Compiler Version** | v0.8.17+commit.8df45f5f |
| **Optimization** | 200 runs |
| **CardFi Test Deploy** | https://testnet.bscscan.com/token/0x067e4A6346d53296998E3F13242C4B9628E5D066 |
| **CardFI_NFT Test Deploy** | https://testnet.bscscan.com/token/0x0De146Cb82099BEc981b79a8343aaDA00Ca2A922 |
| **Domain** | cardfi.co |

# Audit Updates

| | |
|---|---|
| **Initial Audit** | 5th December 2022 https://github.com/cyberscope-io/audits/tree/main/cardfi/v1/audit.pdf |
| **Corrected** | 13th December 2022 |

# Source Files

| Filename | SHA256 |
|---|---|
| **cardFI_NFT.sol** | 5c7f9e4126fd5429c8e045b794908c037c48ed31bc25c9876cf68cf91ca92843 |
| **cardFi.sol** | b8774c00500b8bbde7d7e61ef5344c0c519917930aec2ff6277d4b534277a0de |
| **IcardFi.sol** | 825bbe0a96079b47fb31ac478a98b681b960599bf460cfc80cb02b99bb417472 |

# Introduction

The project consists of two contracts, **cardFi** and **cardFi_NFT**.

The user deposits native currency to receive NFT.

The are two options:

- Pay to receive NFT.
- Pay to receive NFT and lock cardFi tokens to redeem later.

The payment amount, native currency cost, lock period and cardFi amount depends on the card type.

# Roles

The projects includes two roles, Admin and User.

## Admin

The Admin Role has the authority to:

- Alter NFT card type properties.
- Alter deposit and withdraw fees.

## User

The User Role has the authority to:

- Register new currency.
- Register new tokens.
- Deposit native currency to receive NFT.

# Contract Diagnostics

Critical Medium Minor / Informative

| Severity | Code | Description | Status |
|---|---|---|---|
| | STC | Succeeded Transfer Check | Unresolved |
| | PTC | Public Token Claim | Unresolved |
| | CO | Code Optimization | Unresolved |
| | DSM | Data Structure Misuse | Unresolved |
| | L04 | Conformance to Solidity Naming Conventions | Unresolved |

# STC - Succeeded Transfer Check

| | |
|---|---|
| **Criticality** | minor / informative |
| **Location** | contract/cardFi.sol#L189,254<br><br>contract/cardFI_NFT.sol#L62,80,141 |
| **Status** | Unresolved |

## Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
function deposit_native(IERC721Upgradeable _contractAddress, uint256 _tokenId,
uint256 _depositAmount, uint256 newTime) public payable {
    ...
    royaltyAddress.transfer(royalty);
    ...
}
...
function redeem(IERC721Upgradeable _contractAddress, uint256 _tokenId, uint256
_redeemAmount, uint8 v,  bytes32 r,  bytes32 s, string memory message, address
signerAddress) public payable {
    ...
    royaltyAddress.transfer(royalty);
    ...
}
```

```
function mintNft(uint256 cardTypeNumber, string memory URI) public payable {
    ...
    _royaltyAddress.transfer(cost);
    ...
}
...
function mintNftCustom(uint256 cardTypeNumber, string memory URI) public
payable {
    ...
    _royaltyAddress.transfer(cost);
    ...
}
...
function topUpBalance(uint256 amount) public onlyOwner{
    currency.transferFrom(msg.sender, address(this), amount);
}
```

## Recommendation

The contract should check if the result of the transfer methods is successful.

# PTC - Public Token Claim

| | |
|---|---|
| **Criticality** | minor/informative |
| **Location** | contract/cardFi.sol#L193 |
| **Status** | Unresolved |

## Description

The tokenToNft method is public. So any user can claim _tokenId. As a result, the deposit_native method will not be able to run for these tokenIds. Any user can exploit the public permissions to cap the potential token ids that will be claimed from the deposit_native method.

```
function tokenToNft(IERC721Upgradeable _contractAddress, uint256 _tokenId,
IERC20Upgradeable _currency) public {
...
_Card.ERC20Added=true;
...
}
...
require(!_Card.ERC20Added, "this NFT has ERC20 attached");
```

## Recommendation

The team is advised to carefully check if the implementation follows the expected business logic.

# CO - Code Optimization

| | |
|---|---|
| **Criticality** | minor / informative |
| **Location** | contract/cardFi.sol#L142 |
| **Status** | Unresolved |

## Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations. This check is redundant as the function tokenToNft is only called when _Card.ERC20Added is equal to false.

```
require(!_Card.ERC20Added, "this token already has currency assigned");
```

## Recommendation

The authors are advised to remove this check.

# DSM - Data Structure Misuse

| | |
|---|---|
| **Criticality** | minor / informative |
| **Location** | contract/cardFi.sol#L112 |
| **Status** | Unresolved |

## Description

The contract uses the valuable allowedCrypto as an array. The business logic of the contract does not require to iterate this structure sequentially. Thus, unnecessary loops are produced that increase the required gas.

```
IERC20Upgradeable[] public allowedCrypto;
...
function tokenExist(IERC20Upgradeable tokenAddress) public view returns(bool
ifExist) {
    for (uint256 i = 0; i < allowedCrypto.length; i++) {
        if (allowedCrypto[i] == tokenAddress) {
            return true;
        }
    }
    return false;
}
```

## Recommendation

The contract could use a data structure that provides instant access. For instance, a Set or a Map would fit better to the business logic of the contract. This way the time complexity will be reduced from o(n) to o(1).

# L04 - Conformance to Solidity Naming Conventions

| | |
|---|---|
| **Criticality** | minor / informative |
| **Location** | contract/IcardFi.sol#L9<br><br>contract/cardFi.sol#L28,138,215,75,228,66,70,222,68,67,254,159,189,13,69,105,82,99,71,90,128<br><br>contract/cardFI_NFT.sol#L117,62,26,101,17,13,80,39 |
| **Status** | Unresolved |

## Description

Solidity defines a naming convention that should be followed. Rule exceptions:

- Allow constant variable name/symbol/decimals to be lowercase.
- Allow _ at the beginning of the mixed_case match for private variables and unused parameters.

```
deposit_ERC20
Royalties
_tokenId
_currency
_newRoyaltyAddress
_contractAddress
newRoyalty
deposit_ERC20Event
contractBalance_native
...
```

## Recommendation

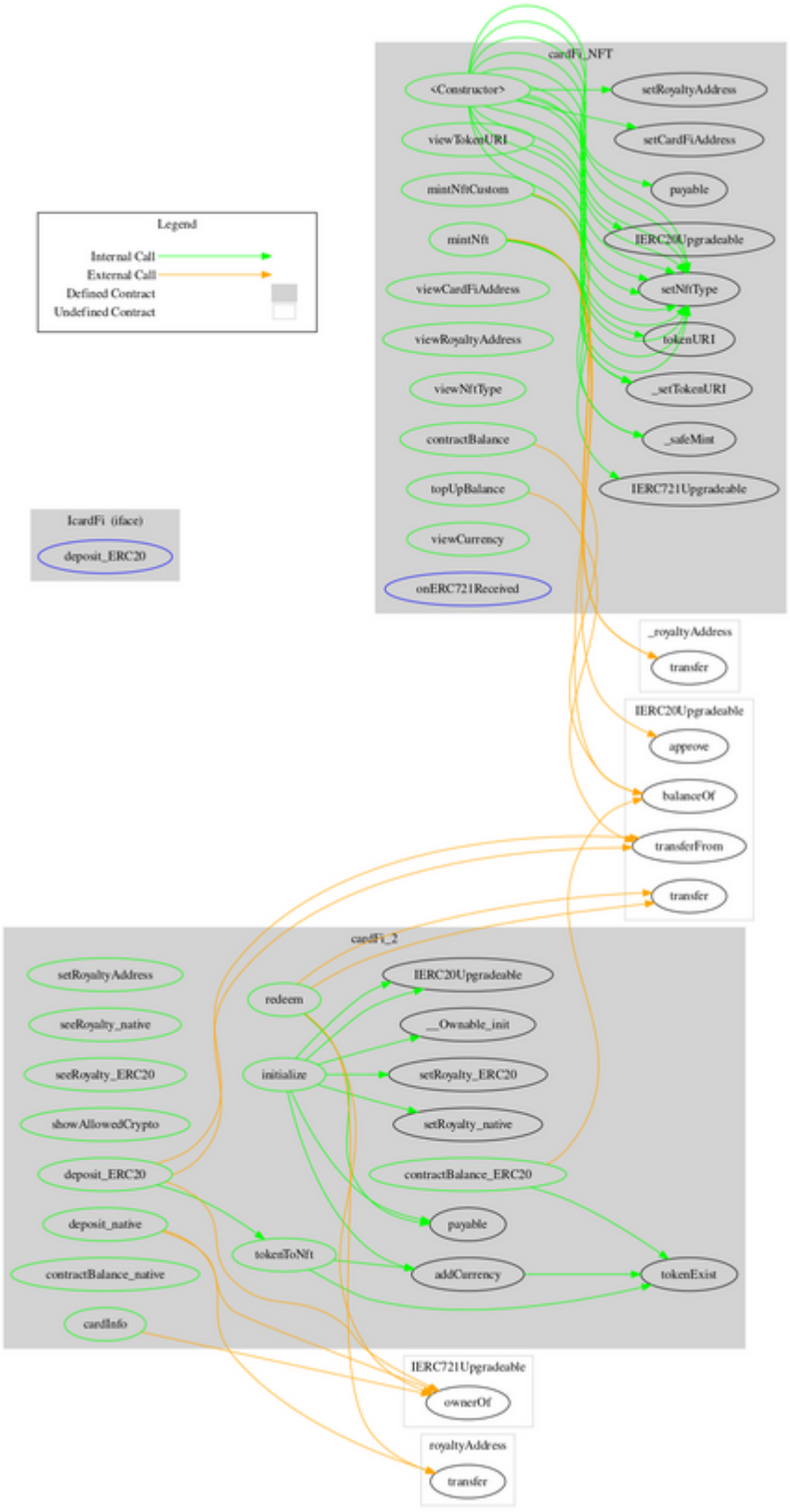
Follow the Solidity naming convention.
https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-conventions.

# Contract Functions

| Contract | Type | Bases | | |
|---|---|---|---|---|
| | **Function Name** | **Visibility** | **Mutability** | **Modifiers** |
| | | | | |
| **cardFi_NFT** | Implementation | ERC721URIStorage, IERC721Receiver, Ownable | | |
| | <Constructor> | Public | ✓ | ERC721 |
| | mintNft | Public | Payable | - |
| | mintNftCustom | Public | Payable | - |
| | viewTokenURI | Public | | - |
| | setCardFiAddress | Public | ✓ | onlyOwner |
| | viewCardFiAddress | Public | | onlyOwner |
| | setRoyaltyAddress | Public | ✓ | onlyOwner |
| | viewRoyaltyAddress | Public | | onlyOwner |
| | setNftType | Public | ✓ | onlyOwner |
| | viewNftType | Public | | - |
| | contractBalance | Public | | onlyOwner |
| | topUpBalance | Public | ✓ | onlyOwner |
| | viewCurrency | Public | | - |
| | onERC721Received | External | | - |
| | | | | |
| **cardFi_2** | Implementation | Initializable, OwnableUpgradeable | | |
| | initialize | Public | ✓ | initializer |
| | setRoyaltyAddress | Public | ✓ | onlyOwner |
| | setRoyalty_native | Public | ✓ | onlyOwner |
| | setRoyalty_ERC20 | Public | ✓ | onlyOwner |
| | seeRoyalty_native | Public | | onlyOwner |
| | seeRoyalty_ERC20 | Public | | onlyOwner |
| | tokenExist | Public | | - |

| | | | | |
|---|---|---|---|---|
| | showAllowedCrypto | Public | | - |
| | addCurrency | Public | ✓ | - |
| | tokenToNft | Public | ✓ | - |
| | deposit_ERC20 | Public | ✓ | - |
| | deposit_native | Public | Payable | - |
| | contractBalance_ERC20 | Public | | onlyOwner |
| | contractBalance_native | Public | | onlyOwner |
| | cardInfo | Public | | - |
| | redeem | Public | ✓ | - |
| | | | | |
| **IcardFi** | Interface | | | |
| | deposit_ERC20 | External | Payable | - |

# Contract Flow



# Domain Info

| | |
|---|---|
| **Domain Name** | cardfi.co |
| **Registry Domain ID** | D47284542FEC9472C9A129B2E3F85D44F-GDREG |
| **Creation Date** | 2022-09-23T03:29:14Z |
| **Updated Date** | 2022-09-28T03:29:14Z |
| **Registry Expiry Date** | 2023-09-23T03:29:14Z |
| **Registrar WHOIS Server** | whois.godaddy.com |
| **Registrar URL** | whois.godaddy.com |
| **Registrar** | GoDaddy.com, LLC |
| **Registrar IANA ID** | 146 |

The domain was created 3 months before the creation of the audit. It will expire in 9 months.

There is no public billing information, the creator is protected by the privacy settings.

# Summary

This audit focused on investigating possible security issues and potential improvements. The audit analysis mentions some concerns that may be produced from the methods public access.

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Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.

The Cyberscope team

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