Cyberscope

Audit Report

Clrs NFT

April 2023

SHA256 14a69f641a693a0ebbc000c82cbe005451a3bc7144160afd72c04dfff8babf70

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Review

Contract Name	NFTPresale
Testing Deploy	https://testnet.bscscan.com/address/0x488b8c3a6c19df49bbf6807aefab1a255251e5f5
Symbol	TST

Audit Updates

Initial Audit	18 Apr 2023

Source Files

Filename	SHA256
contracts/NFTPresale.sol	14a69f641a693a0ebbc000c82cbe005451a3bc7144160afd72c04dfff8babf70

Introduction

This is a contract for an NFT presale. The NFTs are ERC721 tokens.

The contract owner can configure

- The minting cost
- The maximum number of NFTs that can be minted per session.
- The NFTs URIs, the base URI extension.
- The whitelisted addresses.
- The mint limit per address.
- The base URIs.
- The base extension of the NFTs URI.

The contract owner has the authority to

- Reveal the not revealed URI.
- Withdraw funds that send 5% of the balance to HashLips address, and the remainder to the contract owner.

Contract users have to pay the mint costs except for the owner who is exempt.

Findings Breakdown

Critical	0
Medium	0
Minor / Informative	11

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	0	0	0
Minor / Informative	11	0	0	0

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
●	FSO	For Statement Optimization	Unresolved
●	MSC	Missing Sanity Check	Unresolved
●	DSM	Data Structure Misuse	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L11	Unnecessary Boolean equality	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L15	Local Scope Variable Shadowing	Unresolved
●	L17	Usage of Solidity Assembly	Unresolved

FSO - For Statement Optimization

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1774
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.

The contract is aggregating the user's minted balance inside a for loop that does not depend on the loop index since there is the variable `_mintAmount`. This means that the statement is being unnecessarily executed multiple times.

```
for (uint256 i = 1; i <= _mintAmount; i++) {
    addressMintedBalance[msg.sender]++;
    _safeMint(msg.sender, supply + i);
}
```

Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

The contract could move the user's minted balance aggregation after the for-loop.

MSC - Missing Sanity Check

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1865,1837
Status	Unresolved

Description

The contract is processing variables that have not been properly sanitized and checked that they form the proper shape. These variables may produce vulnerability issues.

The whitelisted addresses can be set to zero addresses.

```
function whitelistUsers(address[] calldata _users) public
onlyOwner {
    delete whitelistedAddresses;
    whitelistedAddresses = _users;
}
```

The max mint amount should be greater than 0 since the min mint amount is greater than zero. `require(_mintAmount > 0, "need to mint at least 1 NFT");`

```
function setmaxMintAmount(uint256 _newmaxMintAmount) public
onlyOwner {
    maxMintAmount = _newmaxMintAmount;
}
```

Recommendation

The team is advised to properly check the variables according to the required specifications. The argument address should not be set to zero addresses and the ma mint amount should be greater than 0.

DSM - Data Structure Misuse

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1780
Status	Unresolved

Description

The contract uses the valuable `whitelistedAddresses` 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.

```
function isWhitelisted(address _user) public view returns
(bool) {
    for (uint i = 0; i < whitelistedAddresses.length; i++) {
      if (whitelistedAddresses[i] == _user) {
          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).

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol
Status	Unresolved

Description

SafeMath is a popular Solidity library that provides a set of functions for performing common arithmetic operations in a way that is resistant to integer overflows and underflows.

Starting with Solidity versions that are greater than or equal to 0.8.0, the arithmetic operations revert on underflow and overflow. As a result, the native functionality of the Solidity operations replaces the SafeMath library. Hence, the usage of the SafeMath library adds complexity, overhead and increases the gas consumption unnecessarily.

```
library SafeMath {...}
```

Recommendation

The team is advised to remove the SafeMath library. Since the version of the contract is greater than `0.8.0` then the pure Solidity arithmetic operations produce the same result.

If the previous functionality is required, then the contract could exploit the `unchecked { ... }` statement.

Read more about the breaking change on https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes.

L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1732
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.

```
public maxSupply = 2500;
```

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	contracts/NFTPresale.sol#L1381,1709,1758,1780,1789,1829,1833,1837,1841,1845,1849,1853,1857,1861,1865
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.

```
_mintAmount
_user

_owner


...
```

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.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L293,318,328,347,361,378,388,403,413,428,452,464,499,506,514,525,535,620,638,674,685,727,776,789,819,859,868,883,983,1199,1381,1620,1624,1628,1636,1641,1650,1666
Status	Unresolved

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.

```
function sendValue(address payable recipient, uint256 amount)
internal {
        require(address(this).balance >= amount, "Address:
insufficient balance");

        (bool success, ) = recipient.call{value: amount}("");
        require(success, "Address: unable to send value,
recipient may have reverted");
    }

function functionCall(address target, bytes memory data)
internal returns (bytes memory) {
        return functionCallWithValue(target, data, 0, "Address:
low-level call failed");
    }

...
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

L11 - Unnecessary Boolean equality

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1766,1814
Status	Unresolved

Description

Boolean equality is unnecessary when comparing two boolean values. This is because a boolean value is either true or false, and there is no need to compare two values that are already known to be either true or false.

it's important to be aware of the types of variables and expressions that are being used in the contract's code, as this can affect the contract's behavior and performance. The comparison to boolean constants is redundant. Boolean constants can be used directly and do not need to be compared to true or false.

```
if(Whitelisted == true) {

if(revealed == false) {
```

Recommendation

Using the boolean value itself is clearer and more concise, and it is generally considered good practice to avoid unnecessary boolean equalities in Solidity code.

L14 - Uninitialized Variables in Local Scope

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1796
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.

```
uint256 i
```

Recommendation

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

L15 - Local Scope Variable Shadowing

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L1743,1744,1789
Status	Unresolved

Description

Local scope variable shadowing occurs when a local variable with the same name as a variable in an outer scope is declared within a function or code block. When this happens, the local variable "shadows" the outer variable, meaning that it takes precedence over the outer variable within the scope in which it is declared.

```
string memory _name,

string memory _symbol,

address _owner
```

Recommendation

It's important to be aware of shadowing when working with local variables, as it can lead to confusion and unintended consequences if not used correctly. It's generally a good idea to choose unique names for local variables to avoid shadowing outer variables and causing confusion.

L17 - Usage of Solidity Assembly

Criticality	Minor / Informative
Location	contracts/NFTPresale.sol#L469,546,840,1321
Status	Unresolved

Description

Using assembly can be useful for optimizing code, but it can also be error-prone. It's important to carefully test and debug assembly code to ensure that it is correct and does not contain any errors.

Some common types of errors that can occur when using assembly in Solidity include Syntax, Type, Out-of-bounds, Stack, and Revert.

```
assembly {
                let returndata_size := mload(returndata)
                revert(add(32, returndata), returndata_size)
            }

assembly {
...
                prod1 := sub(sub(mm, prod0), lt(mm, prod0))
            }

assembly {
                ptr := add(buffer, add(32, length))
            }


...
```

Recommendation

It is recommended to use assembly sparingly and only when necessary, as it can be difficult to read and understand compared to Solidity code.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
SafeMath	Library			
	add	Internal		
	sub	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	div	Internal		
	mod	Internal		
	mod	Internal		
IERC165	Interface			
	supportsInterface	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	✓	-
IERC721Metadata	Interface	IERC721		
	name	External		-
	symbol	External		-
	tokenURI	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		
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		
ERC165	Implementation	IERC165		
	supportsInterface	Public		-
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	✓	

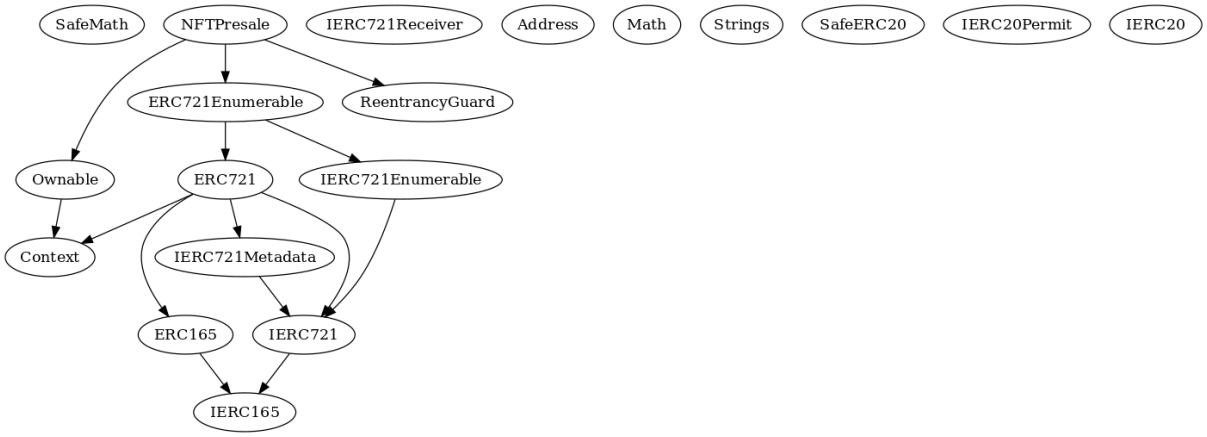
IERC721Enumerable	Interface	IERC721		
	totalSupply	External		-
	tokenOfOwnerByIndex	External		-
	tokenByIndex	External		-
ERC721Enumerable	Implementation	ERC721, IERC721Enumerable		
	supportsInterface	Public		-
	tokenOfOwnerByIndex	Public		-
	totalSupply	Public		-
	tokenByIndex	Public		-
	_beforeTokenTransfer	Internal	✓	
	_addTokenToOwnerEnumeration	Private	✓	
	_addTokenToAllTokensEnumeration	Private	✓	
	_removeTokenFromOwnerEnumeration	Private	✓	
	_removeTokenFromAllTokensEnumeration	Private	✓	
Ownable	Implementation	Context		
		Public	✓	-
	owner	Public		-
	_checkOwner	Internal		
	renounceOwnership	Public	✓	onlyOwner
	transferOwnership	Public	✓	onlyOwner

	_transferOwnership	Internal	✓	
SafeERC20	Library			
	safeTransfer	Internal	✓	
	safeTransferFrom	Internal	✓	
	safeApprove	Internal	✓	
	safeIncreaseAllowance	Internal	✓	
	safeDecreaseAllowance	Internal	✓	
	safePermit	Internal	✓	
	_callOptionalReturn	Private	✓	
ReentrancyGuard	Implementation			
		Public	✓	-
IERC20Permit	Interface			
	permit	External	✓	-
	nonces	External		-
	DOMAIN_SEPARATOR	External		-
IERC20	Interface			
	totalSupply	External		-
	balanceOf	External		-
	transfer	External	✓	-

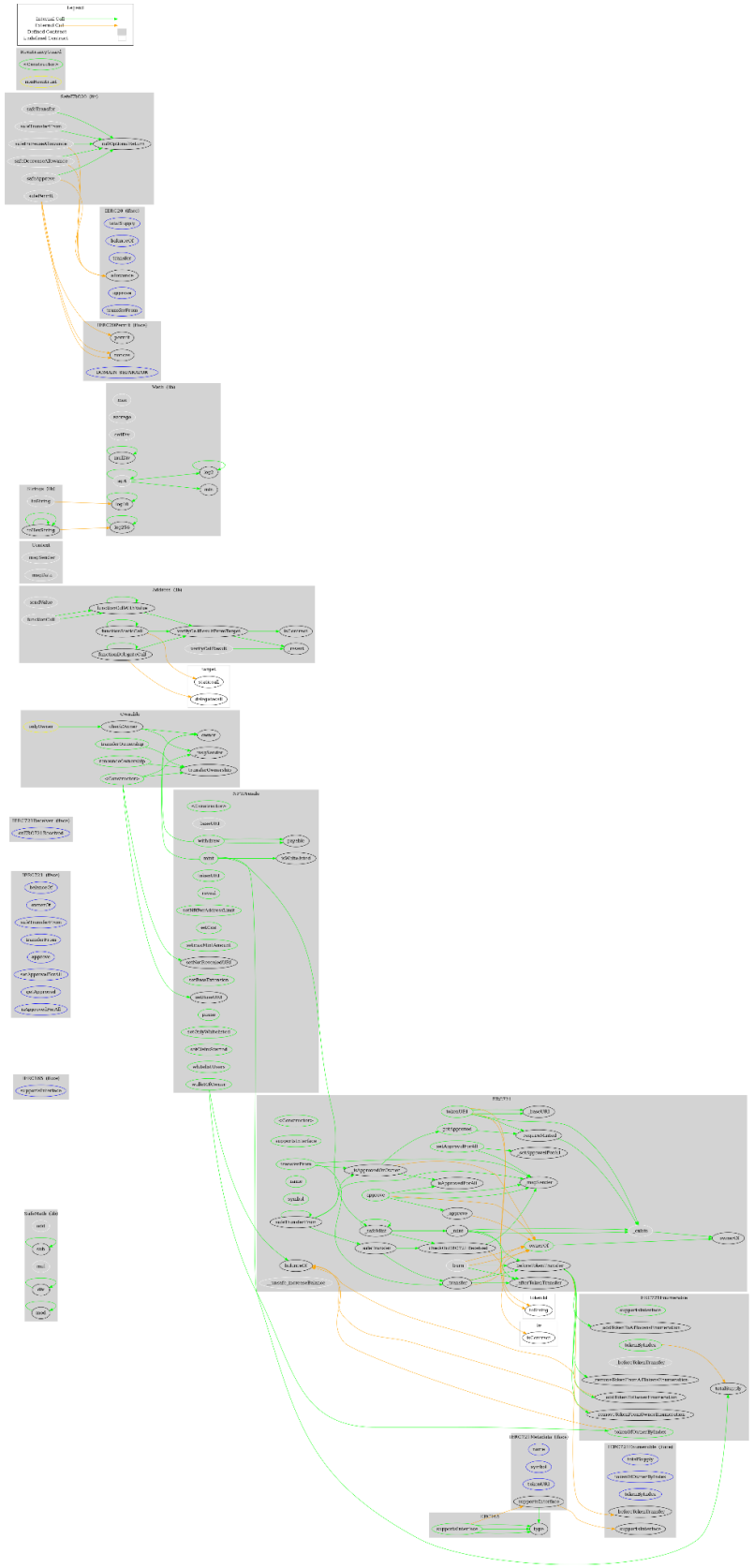
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
NFTPresale	Implementation	ERC721Enumerable, Ownable, ReentrancyGuard		
		Public	✓	ERC721
	_baseURI	Internal		
	mint	Public	Payable	nonReentrant
	isWhitelisted	Public		-
	walletOfOwner	Public		-
	tokenURI	Public		-
	reveal	Public	✓	onlyOwner
	setNftPerAddressLimit	Public	✓	onlyOwner
	setCost	Public	✓	onlyOwner
	setmaxMintAmount	Public	✓	onlyOwner
	setBaseURI	Public	✓	onlyOwner
	setBaseExtension	Public	✓	onlyOwner
	setNotRevealedURI	Public	✓	onlyOwner
	pause	Public	✓	onlyOwner
	setOnlyWhitelisted	Public	✓	onlyOwner
	setClaimStarted	Public	✓	onlyOwner
	whitelistUsers	Public	✓	onlyOwner

	withdraw	Public	Payable	onlyOwner nonReentrant

Inheritance Graph



Flow Graph



Summary

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

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The Cyberscope team

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