Smart Contract Security Audit V1

Metaverser Open World NFT

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Background

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Project Information

- **Website**:
- **Telegram group:**
- **Twitter**:
- **GitHub**:
- **WhitePaper**:
- **Platform**:
- **Contract Address**:

NFT Information

- Name: MOW
- Total Supply:
- Holders:
- Total transactions:

Contracts address deployed to test net (ETH)

MOW NFT contract on testnet

0xaFf5b572793B762B2CAF4358C361756F9D6A9dEf

Executive Summary

According to our assessment, the customer`s solidity smart contract is **Well Secured**.

Well Secured	✔
Secured	
Poor Secured	
Insecure	

Automated checks are with remix IDE. All issues were performed by the team, which included the analysis of code functionality, manual audit found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the audit overview section. The general overview is presented in the Project Information section and all issues found are located in the audit overview section.

Team found 0 critical, 0 high, 0 medium, 0 low, 0 very low-level issues and 3 notes in all solidity files of the contract

The files:

MetaverserNFT.sol
IMarketplaceAssets.sol

File and Function Level Report

File in Scope:

Contract Name	SHA 256 hash	Contract Address
MetaverserNFT.sol	**9d51f95c0ab06466b1c3afb9ba691a85f299acce21b57f915eb3bf4ecedc8b04**	0xaFf5b572793B762B2CAF4358C361756F9D6A9dEf

- Contract: MetaverserNFT
- Inherit: IMarketplaceAssets,ERC721URIStorage,ERC721Enumerable,Ownable,ERC721Holder
- Observation: All passed including security check
- Test Report: passed
- Score: passed
- Conclusion: passed

Function	Test Result	Type / Return Type	Score
name	✔	Read / public	**Passed**
symbol	✔	Read / public	**Passed**
tokenURI	✔	Read / public	**Passed**
getGameAssetsByTokenId	✔	Read / public	**Passed**
balanceOf	✔	Read / public	**Passed**
Owner	✔	Read / public	**Passed**
TokenIdCounter	✔	Read / public	**Passed**
totalSupply	✔	Read / public	**Passed**
getApproved	✔	Read / public	**Passed**
tokenByIndex	✔	Read / public	**Passed**
tokenOfOwnerByIndex	✔	Read / public	**Passed**

supportsInterface	✔	Read / public	**Passed**
isApprovedForAll	✔	Read / public	**Passed**
ownerOf	✔	Read / public	**Passed**
GameAssets	✔	Read / public	**Passed**
createToken	✔	Write / public	**Passed**
onERC721Received	✔	Write / public	**Passed**
setaccessListAddress	✔	Write / public	**Passed**
approveSpendingToken	✔	Write / public	**Passed**
approve	✔	Write / public	**Passed**
safeTransferFrom	✔	Write / public	**Passed**
safeTransferFrom	✔	Write / public	**Passed**
setApprovalForAll	✔	Write / public	**Passed**
setTokenAssetType	✔	Write / public	**Passed**
setTokenName	✔	Write / public	**Passed**
setTokenURI	✔	Write / public	**Passed**
TransferFrom	✔	Write / public	**Passed**
renounceOwnership	✔	Write / public	**Passed**

Issues Checking Status

No.	Issue Description	Checking Status
1	Compiler warnings.	**Passed**
2	Race conditions and Reentrancy. Cross-function race conditions.	**Passed**
3	Possible delays in data delivery.	**Passed**
4	Oracle calls.	**Passed**
5	Front running.	**Passed**
6	Timestamp dependence.	**Passed**
7	Integer Overflow and Underflow.	**Passed**
8	DoS with Revert.	**Passed**
9	DoS with block gas limit.	**Passed with note**
10	Methods execution permissions.	**Passed**
11	Economy model. If application logic is based on an incorrect economic model, the application would not function correctly and participants would incur financial losses. This type of issue is most often found in bonus rewards systems, Staking and Farming contracts, Vault and Vesting contracts, etc.	**Passed**
12	The impact of the exchange rate on the logic.	**Passed**
13	Private user data leaks.	**Passed**
14	Malicious Event log.	**Passed**
15	Scoping and Declarations.	**Passed**
16	Uninitialized storage pointers.	**Passed**
17	Arithmetic accuracy.	**Passed**
18	Design Logic.	**Passed**

Severity Definitions

Risk Level	Description
Critical	Critical vulnerabilities are usually straightforward to exploit and can lead to tokens loss etc.
High	High-level vulnerabilities are difficult to exploit; however, they also have significant impact on smart contract execution, e.g. public access to crucial functions
Medium	Medium-level vulnerabilities are important to fix; however, they can’t lead to tokens lose
Low	Low-level vulnerabilities are mostly related to outdated, unused etc. code snippets, that can’t have significant impact on execution
Note	Lowest-level vulnerabilities, code style violations and info statements can’t affect smart contract execution and can be ignored.

Audit Findings

Critical:

No critical severity vulnerabilities were found.

High:

No High severity vulnerabilities were found

Medium:

No Medium severity vulnerabilities were found.

Low:

No Low severity vulnerabilities were found.

Very Low:

No Very Low severity vulnerabilities were found.

Notes:

#Note1

#Gas cost**:**

In detail
Gas requirement of function ERC721Holder.onERC721Received is infinite: If the gas requirement of a function is higher than the block gas limit, it cannot be executed. Please avoid loops in your functions or actions that modify large areas of storage (this includes clearing or copying arrays in storage).

```
function onERC721Received(
        address,
        address,
        uint256,
        bytes memory
    ) public virtual override returns (bytes4) {
        return this.onERC721Received.selector;
    }
```

This on local calls:

Use of "this" for local functions: Never use "this" to call functions in the same contract, it only consumes more gas than normal local calls.

```
function onERC721Received(
        address,
        address,
        uint256,
        bytes memory
    ) public virtual override returns (bytes4) {
        return this.onERC721Received.selector;
    }
```

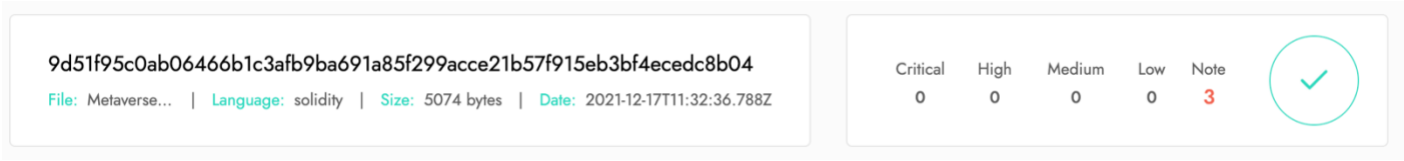
#Delete dynamic array:

The "delete" operation when applied to a dynamically sized array in Solidity generates code to delete each of the elements contained. If the array is large, this operation can surpass the block gas limit and raise an OOG exception. Also nested dynamically sized objects can produce the same results.

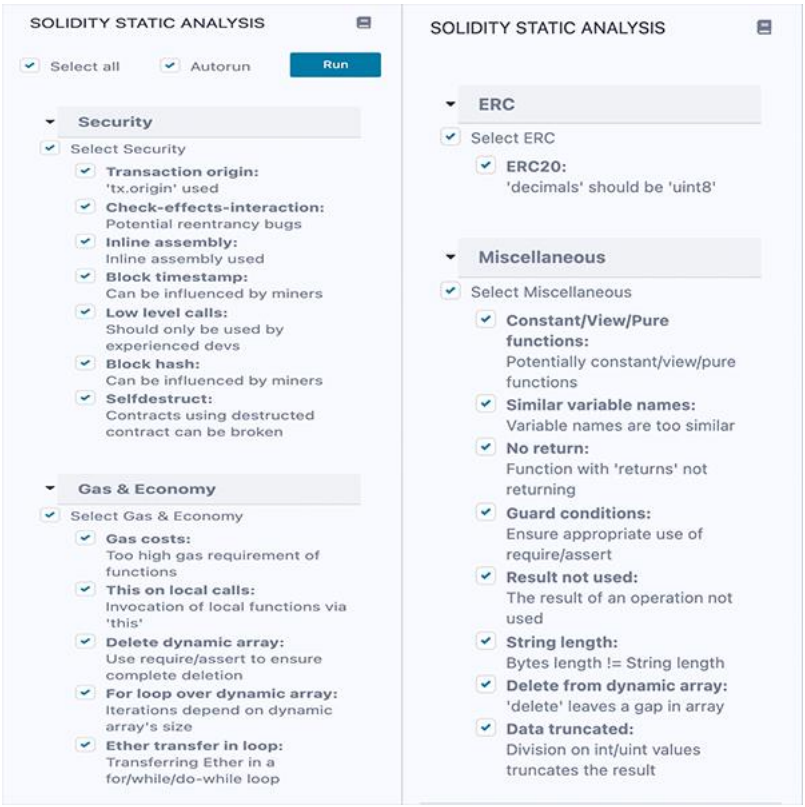
```
function _burn(uint256 tokenId) internal virtual override {
        super._burn(tokenId);

        if (bytes(_tokenURIs[tokenId]).length != 0) {
            delete _tokenURIs[tokenId];
        }
    }
```

Automatic Testing

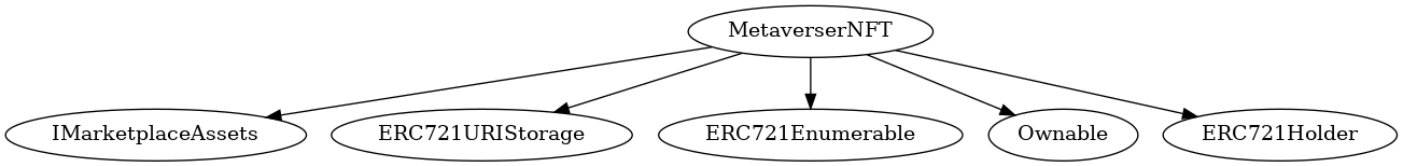
1- Check for security



2- SOLIDITY STATIC ANALYSIS

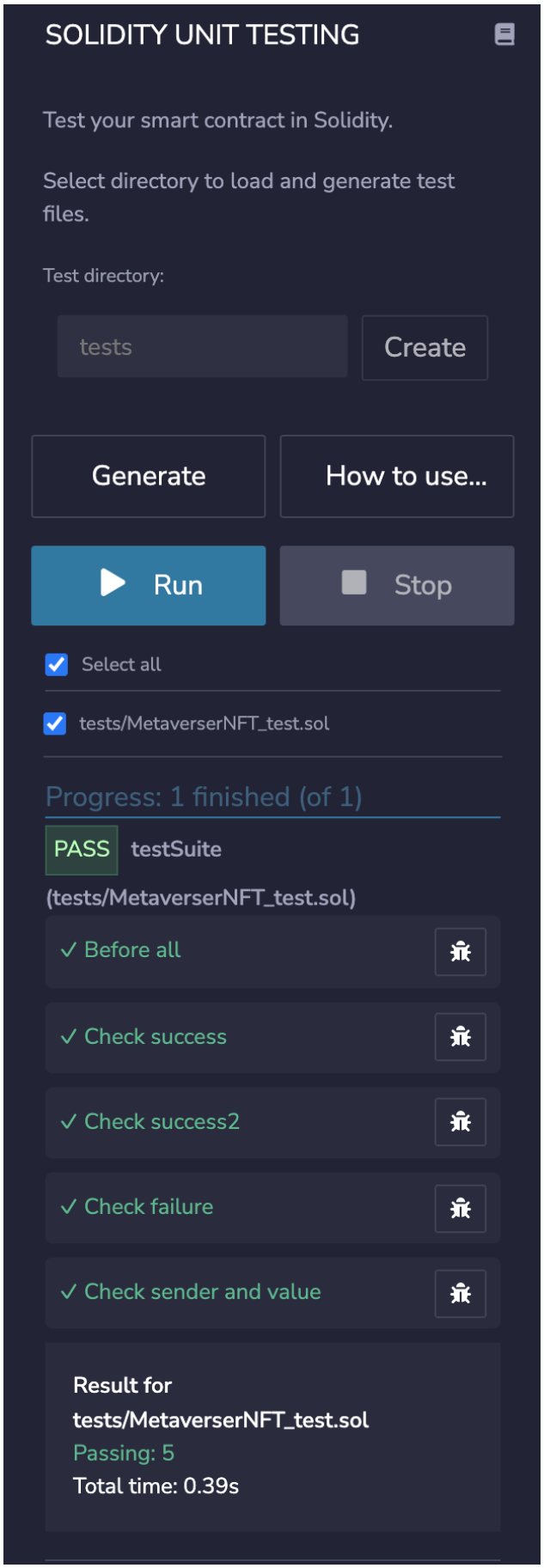


3- Inheritance graph

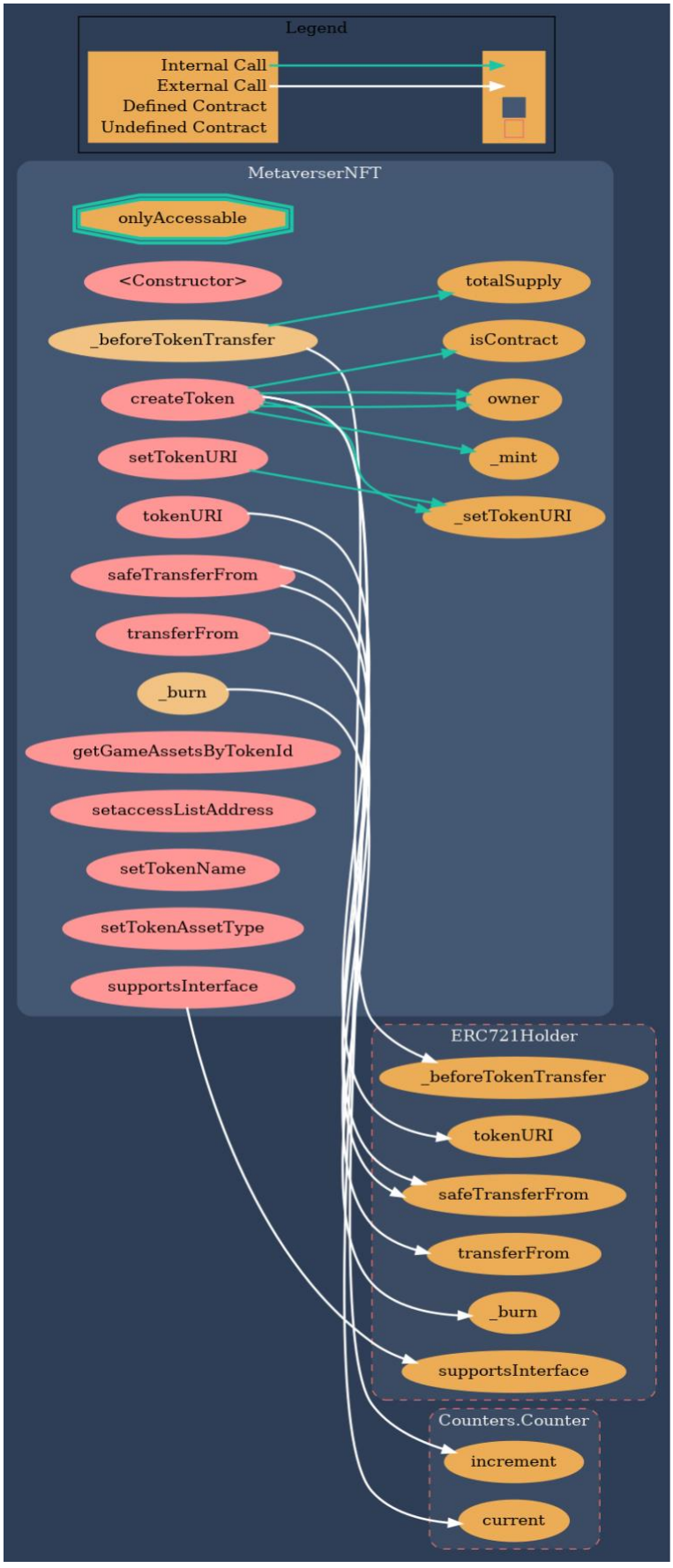


4- SOLIDITY UNIT TESTING

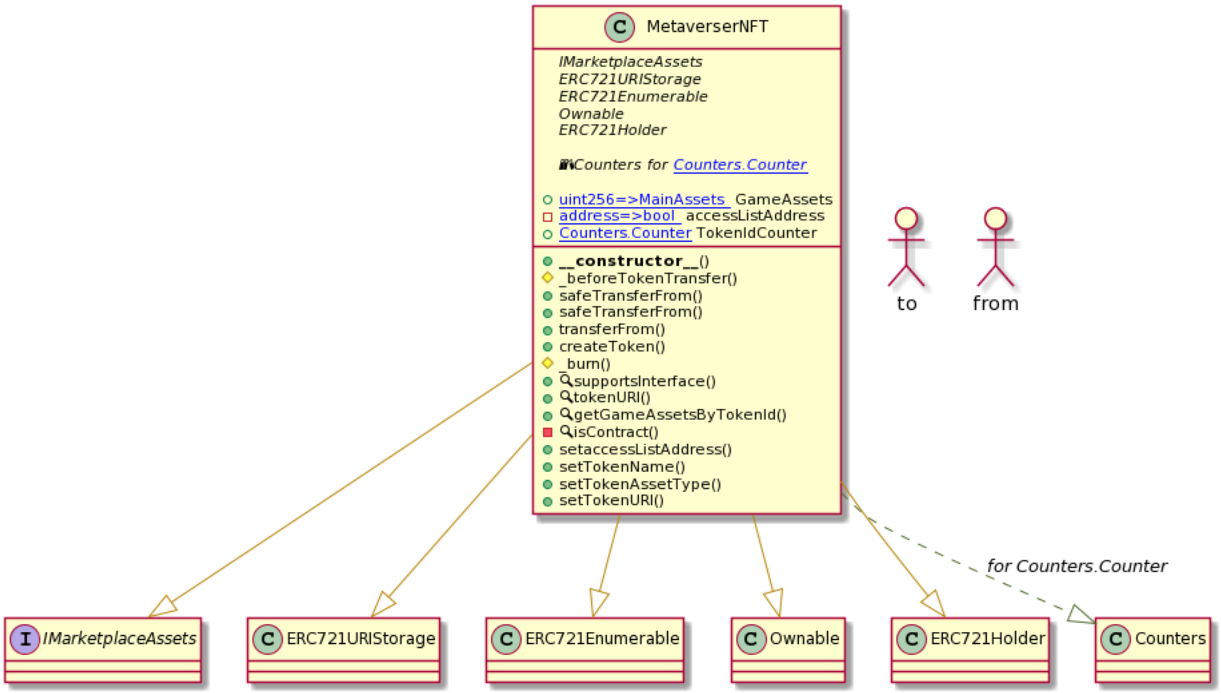
```
// SPDX-License-Identifier: GPL-3.0

pragma solidity >=0.4.22 <0.9.0;

// This import is automatically injected by Remix
import "remix_tests.sol";

// This import is required to use custom transaction context
// Although it may fail compilation in 'Solidity Compiler' plugin
// But it will work fine in 'Solidity Unit Testing' plugin
import "remix_accounts.sol";
import "../MetaverserNFT.sol";

// File name has to end with '_test.sol', this file can contain more than one
testSuite contracts
contract testSuite {

    /// 'beforeAll' runs before all other tests
    /// More special functions are: 'beforeEach', 'beforeAll', 'afterEach' &
'afterAll'
    function beforeAll() public {
        // <instantiate contract>
        Assert.equal(uint(1), uint(1), "1 should be equal to 1");
    }

    function checkSuccess() public {
        // Use 'Assert' methods: https://remix-
ide.readthedocs.io/en/latest/assert_library.html
        Assert.ok(2 == 2, 'should be true');
        Assert.greaterThan(uint(2), uint(1), "2 should be greater than to 1");
        Assert.lesserThan(uint(2), uint(3), "2 should be lesser than to 3");
    }

    function checkSuccess2() public pure returns (bool) {
        // Use the return value (true or false) to test the contract
        return true;
    }

    function checkFailure() public {
        Assert.notEqual(uint(1), uint(2), "1 should not be equal to 1");
    }

    /// Custom Transaction Context: https://remix-
ide.readthedocs.io/en/latest/unittesting.html#customization
    /// #sender: account-1
    /// #value: 100
    function checkSenderAndValue() public payable {
        // account index varies 0-9, value is in wei
        Assert.equal(msg.sender, TestsAccounts.getAccount(1), "Invalid sender");
        Assert.equal(msg.value, 100, "Invalid value");
    }
}
```


SOLIDITY UNIT TESTING
Test your smart contract in Solidity.
Select directory to load and generate test files.
Test directory:
tests
Create
Generate
How to use...
Run
Stop
Select all
tests/MetaverserNFT_test.sol
Progress: 1 finished (of 1)
PASS testSuite
(tests/MetaverserNFT_test.sol)
✓ Before all
✓ Check success
✓ Check success2
✓ Check failure
✓ Check sender and value
Result for
tests/MetaverserNFT_test.sol
Passing: 5
Total time: 0.39s

5- Call graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
MetaverserNFT
onlyAccessable
<Constructor>
_beforeTokenTransfer
createToken
setTokenURI
tokenURI
safeTransferFrom
transferFrom
_burn
getGameAssetsByTokenId
setaccessListAddress
setTokenName
setTokenAssetType
supportsInterface
totalSupply
isContract
owner
_mint
_setTokenURI
ERC721Holder
_beforeTokenTransfer
tokenURI
safeTransferFrom
transferFrom
_burn
supportsInterface
Counters.Counter
increment
current

Unified Modeling Language (UML)



Functions signature

```
16279055  =>  isContract(address)
9693b8f3  =>  getFullData()
cad3be83  =>  _beforeTokenTransfer(address,address,uint256)
42842e0e  =>  safeTransferFrom(address,address,uint256)
b88d4fde  =>  safeTransferFrom(address,address,uint256,bytes)
23b872dd  =>  transferFrom(address,address,uint256)
322caed1  =>  createToken(string,string,uint256,string)
9b1f9e74  =>  _burn(uint256)
01ffc9a7  =>  supportsInterface(bytes4)
c87b56dd  =>  tokenURI(uint256)
afd1b116  =>  getGameAssetsByTokenId(uint256)
e0ac1709  =>  setaccessListAddress(address,bool)
cdb0e89e  =>  setTokenName(uint256,string)
dacc6e3e  =>  setTokenAssetType(uint256,uint256)
162094c4  =>  setTokenURI(uint256,string)
```

Automatic general report

Files Description Table

File Name	SHA-1 Hash
/Users/macbook/Desktop/smart contracts/MetaverserNFT.sol	80df2982f170ac08a12306ae62f7c3b22d0b32bd

Contracts Description Table

Contract	Type	Bases		
└	**Function Name**	**Visibility**	**Mutability**	**Modifiers**
IMarketplaceAssets	Interface			
MetaverserNFT	Implementation	IMarketplaceAssets, ERC721URIStorage, ERC721Enumerable, Ownable, ERC721Holder		
└	<Constructor>	Public ❗	🛑	ERC721
└	_beforeTokenTransfer	Internal 🔒	🛑	
└	safeTransferFrom	Public ❗	🛑	onlyAccessable
└	safeTransferFrom	Public ❗	🛑	onlyAccessable
└	transferFrom	Public ❗	🛑	onlyAccessable
└	createToken	Public ❗	🛑	NO❗
└	_burn	Internal 🔒	🛑	
└	supportsInterface	Public ❗		NO❗
└	tokenURI	Public ❗		NO❗
└	getGameAssetsByTokenId	Public ❗		NO❗
└	isContract	Private 🔐		
└	setaccessListAddress	Public ❗	🛑	onlyOwner
└	setTokenName	Public ❗	🛑	onlyAccessable
└	setTokenAssetType	Public ❗	🛑	onlyAccessable
└	setTokenURI	Public ❗	🛑	onlyAccessable

Legend

Symbol	Meaning
🛑	Function can modify state
💵	Function is payable

Conclusion

The contracts are written systematically. Team found no critical issues. So, it is good to go for production.

Since possible test cases can be unlimited and developer level documentation (code flow diagram with function level description) not provided, for such an extensive smart contract protocol, we provide no such guarantee of future outcomes. We have used all the latest static tools and manual observations to cover maximum possible test cases to scan Everything.

Security state of the reviewed contract is “well secured”.

- ✔ No volatile code.
- ✔ Not many high severity issues were found.

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. 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 the team on the basis of what it says or doesn't say, or how team produced it, and it is important for you to conduct your own independent investigations before making any decisions. team go into more detail on this in the below disclaimer below – please make sure to read it in full.

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