

Smart Contract Security Audit V1

Pirates of the pandemic Smart Contract

9/3/2022



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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

- **Platform:** Ethereum
- **Contract Address:** 0x721eF85DD162802452359834f954f5af2Aac9399
- **Code:**

<https://rinkeby.etherscan.io/address/0x721ef85dd162802452359834f954f5af2aac9399>

NFT Information

- Name: POTP
- MAX Supply: 4444
- Holders:
- Total transactions:

Contracts address deployed to test net (Ethereum)

Pirates of the pandemic Smart contract on ETH test net to test every function by the auditor.

<https://rinkeby.etherscan.io/address/0x721ef85dd162802452359834f954f5af2aac9399>

Executive Summary

According to our assessment, the customer`s solidity smart contract is **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, 1 low, 0 very low-level issues and 0 notes in all solidity files of the contract

The files:

POTP.sol

File and Function Level Report

File in Scope:

Contract Name	SHA 256 hash	Contract Address
PiratesOfThePandemic.sol	fbcb806056edc737db189f8d3dba740ce4f036e1240420e3451c22020dafa4d49	0x721eF85DD162802452359834f954f5af2Aac9399

- Contract: PiratesOfThePandemic
- Inherit: ERC721, Ownable
- 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
publicSaleCost	✓	Read / public	Passed
supportsInterface	✓	Read / public	Passed
merkleRoot	✓	Read / public	Passed
balanceOf	✓	Read / public	Passed
Owner	✓	Read / public	Passed
uriPrefix	✓	Read / public	Passed
walletOfOwner	✓	Read / public	Passed
getApprovedForAll	✓	Read / public	Passed
paused	✓	Read / public	Passed
getApproved	✓	Read / public	Passed

ownerOf	✓	Read / public	Passed
tokenURI	✓	Read / public	Passed
presaleCost	✓	Read / public	Passed
presaleActive	✓	Read / public	Passed
maxMintAmountPerTx	✓	Read / public	Passed
max_Supply	✓	Read / public	Passed
totalSupply	✓	Read / public	Passed
setUriPrefix	✓	Write / public	Passed
approve	✓	Write / public	Passed
safeTransferFrom	✓	Write / public	Passed
safeTransferFrom	✓	Write / public	Passed
endPresale	✓	Write / public	Passed
setPaused	✓	Write / public	Passed
mint	✓	Write / payable	Passed
setPresaleCost	✓	Write / public	Passed
transferOwnership	✓	Write / public	Passed
setApprovalForAll	✓	Write / public	Passed
transferFrom	✓	Write / public	Passed
withdraw	✓	Write / public	Passed
setMarketRoot	✓	Write / public	Passed
renounceOwnership	✓	Write / public	Passed
mintForAddress	✓	Write / public	Passed
setMaxMintPerTx	✓	Write / public	Passed
setPublicSaleCost	✓	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	Design Logic.	Passed
6	Timestamp dependence.	Passed
7	Integer Overflow and Underflow.	Passed
8	DoS with Revert.	Passed
9	DoS with block gas limit.	Passed with Notes
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

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:

#Multiple pragma statements

Line	Pragma
14	pragma solidity ^0.8.0;
89	pragma solidity ^0.8.0;
135	pragma solidity ^0.8.0;
205	pragma solidity ^0.8.0;
232	pragma solidity ^0.8.0;
310	pragma solidity ^0.8.0;
530	pragma solidity ^0.8.0;
560	pragma solidity ^0.8.0;
588	pragma solidity ^0.8.0;
619	pragma solidity ^0.8.0;
764	pragma solidity ^0.8.0;
793	pragma solidity ^0.8.0;

Description

There are multiple pragma statements in the code. Only the compiler version 0.8.2 will work with the code, but keeping only one pragma statement helps in maintaining readability of the code.

Remediation

Keep a single pragma statement.

Status: **Closed**. Fixed In version 2

Very Low:

No Very Low severity vulnerabilities were found.

Notes:

No Notes were found

Automatic Testing

1- Check for security

fb806056edc737db189f8d3dba740ce4f036e1240420e3451c22020dafa4d...

File: POTP.sol | Language: solidity | Size: 22817 bytes | Date: 2022-03-09T17:22:45.758Z

Critical	High	Medium	Low	Note
0	0	0	0	0



2- SOLIDITY STATIC ANALYSIS

SOLIDITY STATIC ANALYSIS

☒ Select all ☒ Autorun Run

Security

☒ Select Security

- ☒ Transaction origin:
'tx.origin' used
- ☒ Check-effects-interaction:
Potential reentrancy bugs
- ☒ Inline assembly:
Inline assembly used
- ☒ Block timestamp:
Can be influenced by miners
- ☒ Low level calls:
Should only be used by experienced devs
- ☒ Block hash:
Can be influenced by miners
- ☒ Selfdestruct:
Contracts using destructed contract can be broken

Gas & Economy

☒ Select Gas & Economy

- ☒ Gas costs:
Too high gas requirement of functions
- ☒ This on local calls:
Invocation of local functions via 'this'
- ☒ Delete dynamic array:
Use require/assert to ensure complete deletion
- ☒ For loop over dynamic array:
Iterations depend on dynamic array's size
- ☒ Ether transfer in loop:
Transferring Ether in a for/while/do-while loop

SOLIDITY STATIC ANALYSIS

☒ Select ERC

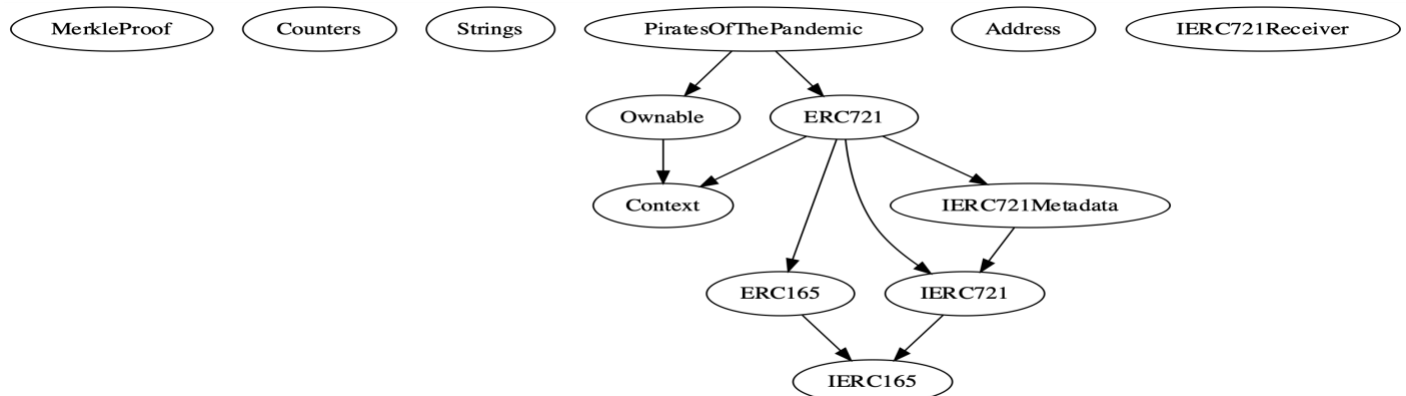
- ☒ ERC20:
'decimals' should be 'uint8'

Miscellaneous

☒ Select Miscellaneous

- ☒ Constant/View/Pure functions:
Potentially constant/view/pure functions
- ☒ Similar variable names:
Variable names are too similar
- ☒ No return:
Function with 'returns' not returning
- ☒ Guard conditions:
Ensure appropriate use of require/assert
- ☒ Result not used:
The result of an operation not used
- ☒ String length:
Bytes length != String length
- ☒ Delete from dynamic array:
'delete' leaves a gap in array
- ☒ Data truncated:
Division on int/uint values truncates the result

3- Inheritance graph



4- SOLIDITY UNIT TESTING

SOLIDITY UNIT TESTING

Test your smart contract in Solidity.

Select directory to load and generate test files.

Test directory:

☒ Select all

☒ tests/POTP_test.sol

Progress: 1 finished (of 1)

PASS

testSuite (tests/POTP_test.sol)

✓ Before all

✓ Check success

✓ Check success2

✓ Check failure

✓ Check sender and value

Result for tests/POTP_test.sol

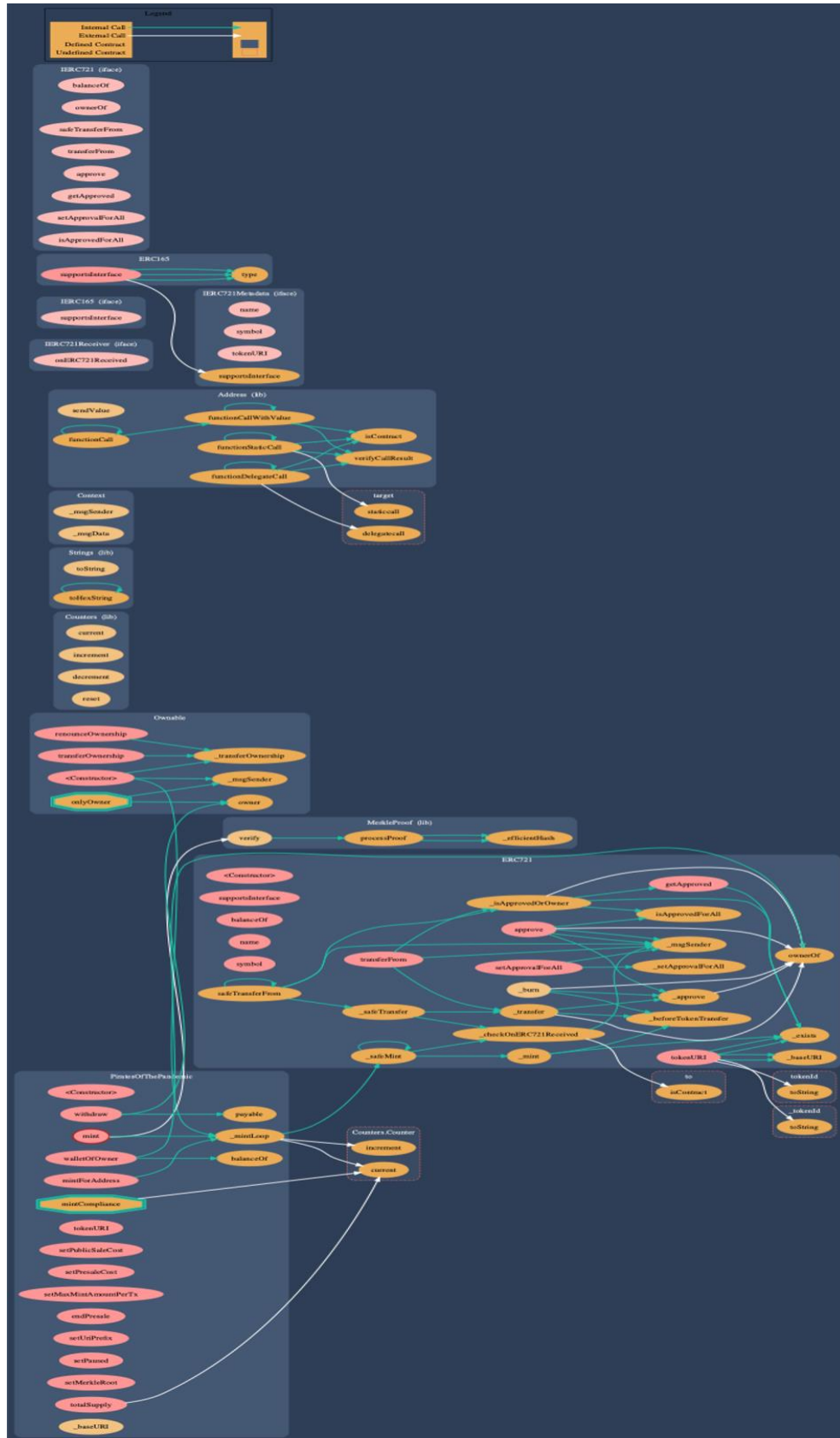
Passed: 5

Failed: 0

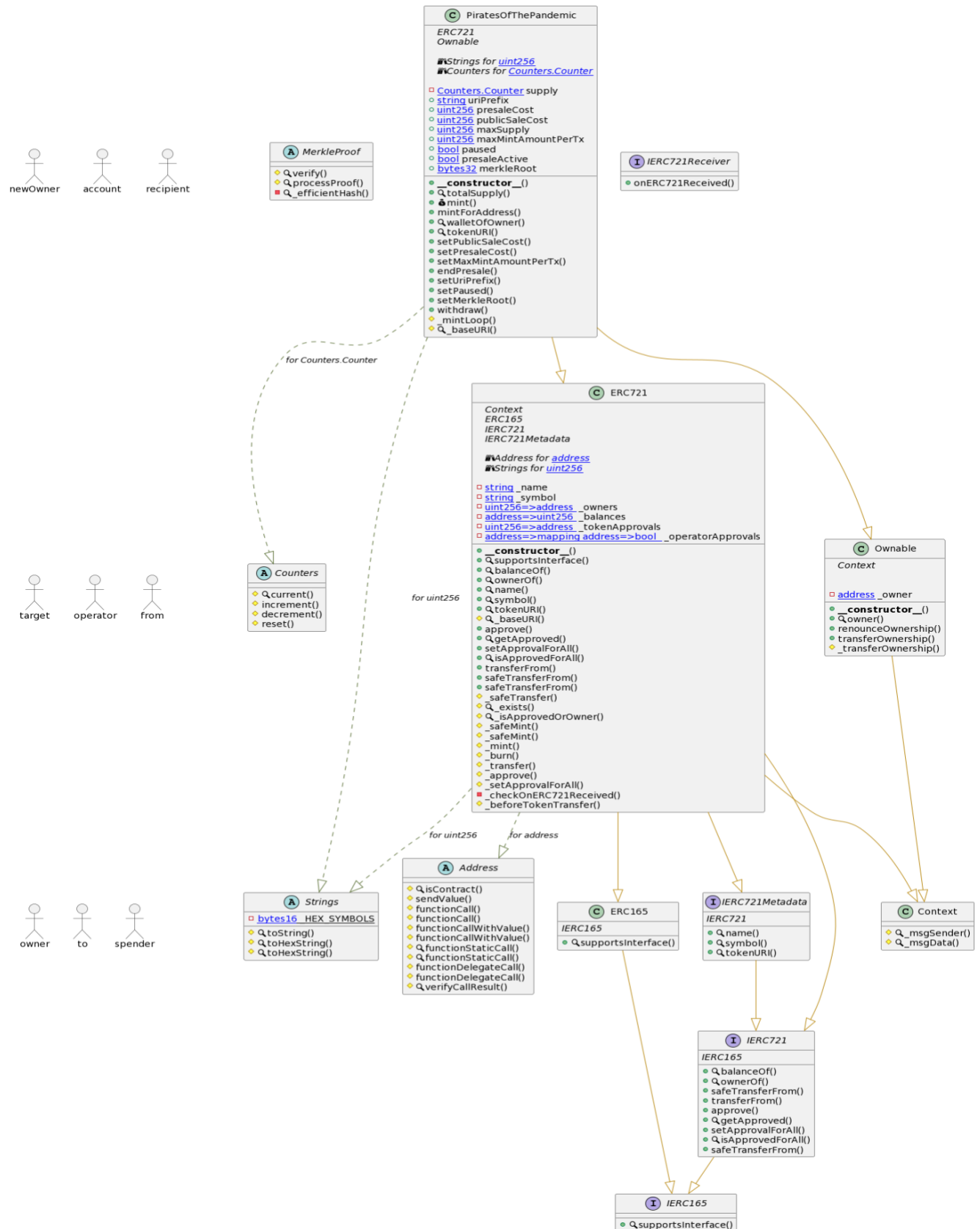
Time Taken: 0.35s

5-

Call graph



Unified Modeling Language (UML)



Functions signature

Sighash	Function Signature
=====	
16279055	=> isContract (address)
5a9a49c7	=> verify (bytes32[], bytes32, bytes32)
62702a6b	=> processProof (bytes32[], bytes32)
41ed615b	=> _efficientHash (bytes32, bytes32)
ad04a8d1	=> current (Counter)
e2bee435	=> increment (Counter)
854ec98e	=> decrement (Counter)
440d212a	=> reset (Counter)
6900a3ae	=> toString (uint256)
8fba8d5c	=> toHexString (uint256)
63e1cbea	=> toHexString (uint256, uint256)
119df25f	=> _msgSender ()
8b49d47e	=> _msgData ()
8da5cb5b	=> owner ()
715018a6	=> renounceOwnership ()
f2fde38b	=> transferOwnership (address)
d29d44ee	=> _transferOwnership (address)
24a084df	=> sendValue (address, uint256)
a0b5ffb0	=> functionCall (address, bytes)
241b5886	=> functionCall (address, bytes, string)
2a011594	=> functionCallWithValue (address, bytes, uint256)
d525ab8a	=> functionCallWithValue (address, bytes, uint256, string)
c21d36f3	=> functionStaticCall (address, bytes)
dbc40fb9	=> functionStaticCall (address, bytes, string)
ee33b7e2	=> functionDelegateCall (address, bytes)
57387df0	=> functionDelegateCall (address, bytes, string)
946b5793	=> verifyCallResult (bool, bytes, string)
150b7a02	=> onERC721Received (address, address, uint256, bytes)
01ffc9a7	=> supportsInterface (bytes4)
70a08231	=> balanceOf (address)
6352211e	=> ownerOf (uint256)
42842e0e	=> safeTransferFrom (address, address, uint256)
23b872dd	=> transferFrom (address, address, uint256)
095ea7b3	=> approve (address, uint256)
081812fc	=> getApproved (uint256)
a22cb465	=> setApprovalForAll (address, bool)
e985e9c5	=> isApprovedForAll (address, address)
b88d4fde	=> safeTransferFrom (address, address, uint256, bytes)
06fdde03	=> name ()
95d89b41	=> symbol ()
c87b56dd	=> tokenURI (uint256)
743976a0	=> _baseURI ()
24b6b8c0	=> _safeTransfer (address, address, uint256, bytes)
f8e76cc0	=> _exists (uint256)
4cdc9549	=> _isApprovedOrOwner (address, uint256)
b3e1c718	=> _safeMint (address, uint256)
6a4f832b	=> _safeMint (address, uint256, bytes)
4e6ec247	=> _mint (address, uint256)
9b1f9e74	=> _burn (uint256)
30e0789e	=> _transfer (address, address, uint256)
7b7d7225	=> _approve (address, uint256)

```
8c4e3f32 => _setApprovalForAll(address,address,bool)
1fd01de1 => _checkOnERC721Received(address,address,uint256,bytes)
cad3be83 => _beforeTokenTransfer(address,address,uint256)
18160ddd => totalSupply()
45de0d9b => mint(bytes32[],uint256)
efbd73f4 => mintForAddress(uint256,address)
438b6300 => walletOfOwner(address)
8dbb7c06 => setPublicSaleCost(uint256)
8fdcf942 => setPresaleCost(uint256)
b071401b => setMaxMintAmountPerTx(uint256)
a43be57b => endPresale()
7ec4a659 => setUriPrefix(string)
16c38b3c => setPaused(bool)
7cb64759 => setMerkleRoot(bytes32)
3ccfd60b => withdraw()
0d43db94 => _mintLoop(address,uint256)
```


Automatic general report

Files Description Table

File Name	SHA-1 Hash
/Users/macbook/Desktop/smart contracts/POTP.sol	7b6853ff04a19f6bec0cffab17bb6ef282a5e943

Contracts Description Table




































Contract	Type	Bases		
:-----: :-----: :-----: :-----: :-----				
L	**Function Name**	**Visibility**	**Mutability**	
Modifiers				
MerkleProof Library				
L verify	Internal	🔒		
L processProof	Internal	🔒		
L _efficientHash	Private	🔒		
Counters Library				
L current	Internal	🔒		
L increment	Internal	🔒	⛔	
L decrement	Internal	🔒	⛔	
L reset	Internal	🔒	⛔	
Strings Library				
L toString	Internal	🔒		
L toHexString	Internal	🔒		
L toHexString	Internal	🔒		
Context Implementation				
L _msgSender	Internal	🔒		
L _msgData	Internal	🔒		
Ownable Implementation Context				
L <Constructor>	Public	!	⛔	NO!
L owner	Public	!	NO!	
L renounceOwnership	Public	!	⛔	onlyOwner
L transferOwnership	Public	!	⛔	onlyOwner
L _transferOwnership	Internal	🔒	⛔	
Address Library				
L isContract	Internal	🔒		
L sendValue	Internal	🔒	⛔	
L functionCall	Internal	🔒	⛔	
L functionCall	Internal	🔒	⛔	
L functionCallWithValue	Internal	🔒	⛔	
L functionCallWithValue	Internal	🔒	⛔	
L functionStaticCall	Internal	🔒		
L functionStaticCall	Internal	🔒		

```

| L | functionDelegateCall | Internal | 🔒 | 🔒 | |
| L | functionDelegateCall | Internal | 🔒 | 🔒 | |
| L | verifyCallResult | Internal | 🔒 | | |
| | | |
| **IERC721Receiver** | Interface | | |
| L | onERC721Received | External | ⚠️ | 🔒 | NO! |
| | | |
| **IERC165** | Interface | | |
| L | supportsInterface | External | ⚠️ | | NO! |
| | | |
| **ERC165** | Implementation | IERC165 | | |
| L | supportsInterface | Public | ⚠️ | | NO! |
| | | |
| **IERC721** | Interface | IERC165 | | |
| L | balanceOf | External | ⚠️ | | NO! |
| L | ownerOf | External | ⚠️ | | NO! |
| L | safeTransferFrom | External | ⚠️ | 🔒 | NO! |
| L | transferFrom | External | ⚠️ | 🔒 | NO! |
| L | approve | External | ⚠️ | 🔒 | NO! |
| L | getApproved | External | ⚠️ | | NO! |
| L | setApprovalForAll | External | ⚠️ | 🔒 | NO! |
| L | isApprovedForAll | External | ⚠️ | | NO! |
| L | safeTransferFrom | External | ⚠️ | 🔒 | NO! |
| | | |
| **IERC721Metadata** | Interface | IERC721 | | |
| L | name | External | ⚠️ | | NO! |
| L | symbol | External | ⚠️ | | NO! |
| L | tokenURI | External | ⚠️ | | NO! |
| | | |
| **ERC721** | Implementation | Context, ERC165, IERC721, IERC721Metadata | | |
| L | <Constructor> | Public | ⚠️ | 🔒 | NO! |
| L | supportsInterface | Public | ⚠️ | | NO! |
| L | balanceOf | Public | ⚠️ | | NO! |
| L | ownerOf | Public | ⚠️ | | NO! |
| L | name | Public | ⚠️ | | NO! |
| L | symbol | Public | ⚠️ | | NO! |
| L | tokenURI | Public | ⚠️ | | NO! |
| L | _baseURI | Internal | 🔒 | | |
| L | approve | Public | ⚠️ | 🔒 | NO! |
| L | getApproved | Public | ⚠️ | | NO! |
| L | setApprovalForAll | Public | ⚠️ | 🔒 | NO! |
| L | isApprovedForAll | Public | ⚠️ | | NO! |
| L | transferFrom | Public | ⚠️ | 🔒 | NO! |
| L | safeTransferFrom | Public | ⚠️ | 🔒 | NO! |
| L | safeTransferFrom | Public | ⚠️ | 🔒 | NO! |
| L | _safeTransfer | Internal | 🔒 | 🔒 | |
| L | _exists | Internal | 🔒 | | |
| L | _isApprovedOrOwner | Internal | 🔒 | | |
| L | _safeMint | Internal | 🔒 | 🔒 | |
| L | _safeMint | Internal | 🔒 | 🔒 | |
| L | _mint | Internal | 🔒 | 🔒 | |
| L | _burn | Internal | 🔒 | 🔒 | |
| L | _transfer | Internal | 🔒 | 🔒 | |
| L | _approve | Internal | 🔒 | 🔒 | |
| L | _setApprovalForAll | Internal | 🔒 | 🔒 | |



```

```

| L | _checkOnERC721Received | Private |  |  | | |
| L | _beforeTokenTransfer | Internal |  |  | |
| | | |
| **PiratesOfThePandemic** | Implementation | ERC721, Ownable | | |
| L | <Constructor> | Public |  |  | ERC721 |
| L | totalSupply | Public |  | | NO |  |
| L | mint | Public |  |  | mintCompliance |
| L | mintForAddress | Public |  |  | mintCompliance onlyOwner |
| L | walletOfOwner | Public |  | | NO |  |
| L | tokenURI | Public |  | | NO |  |
| L | setPublicSaleCost | Public |  |  | onlyOwner |
| L | setPresaleCost | Public |  |  | onlyOwner |
| L | setMaxMintAmountPerTx | Public |  |  | onlyOwner |
| L | endPresale | Public |  |  | onlyOwner |
| L | setUriPrefix | Public |  |  | onlyOwner |
| L | setPaused | Public |  |  | onlyOwner |
| L | setMerkleRoot | Public |  |  | onlyOwner |
| L | withdraw | Public |  |  | onlyOwner |
| L | _mintLoop | Internal |  |  | |
| L | _baseURI | Internal |  | | |

```

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 “ 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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