# Smart Contract
# Security Audit
# V1

## Gerbs Smart Contract

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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**: 0xB8ab18fb3b76d7c8219e1ED22077345E0214F1E8
- **Code:**

**https://github.com/Saferico/Smart-Contracts-for-Projects/blob/main/Gerbs.sol**

## NFT Information

- Name: Gerbs
- Total Supply: 4444
- Holders:
- Total transactions:

### Contracts address deployed to test net (ETH)

Gerbs Smart contract on ETH test net to test write functions by the auditor.

https://rinkeby.etherscan.io/address/0xb8ab18fb3b76d7c8219e1ed22077345e0214f1e8

# Executive Summary

According to our assessment, the customer`s solidity smart contract is **Well-Secured**. Because the team fix all low issues.

| | |
|---|---|
| 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, 4 low, 0 very low-level issues and 0 note in all solidity files of the contract

The files:

Gerbs.sol

# File and Function Level Report

## File in Scope:

| Contract Name | SHA 256 hash | Contract Address |
|---|---|---|
| Gerbs.sol | **4b1230c35799076107d1025a8045f39db4412598405c094a338bdfd61bfab145** | 0xB8ab18fb3b76d7c8219e1ED22077345E0214F1E8 |

- Contract: Gerbs
- Inherit: ERC721Enumerable, 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** |
| cost | ✓ | Read / public | **Passed** |
| supportsInterface | ✓ | Read / public | **Passed** |
| hiddenURL | ✓ | Read / public | **Passed** |
| balanceOf | ✓ | Read / public | **Passed** |
| Owner | ✓ | Read / public | **Passed** |
| maxWLMintAmountPerWallet | ✓ | Read / public | **Passed** |
| maxMintAmountPerTx | ✓ | Read / public | **Passed** |
| getApprovedForAll | ✓ | Read / public | **Passed** |
| ownerOf | ✓ | Read / public | **Passed** |
| getApproved | ✓ | Read / public | **Passed** |

| | | | |
|---|---|---|---|
| tokenURI | ✓ | Read / public | **Passed** |
| tokenByIndex | ✓ | Read / public | **Passed** |
| tokenOfOwnerByIndex | ✓ | Read / public | **Passed** |
| whiteListCost | ✓ | Read / public | **Passed** |
| whitelistMerkleRoot | ✓ | Read / public | **Passed** |
| nftPerWLAddress | ✓ | Read / public | **Passed** |
| paused | ✓ | Read / public | **Passed** |
| reveal | ✓ | Read / public | **Passed** |
| maxSupply | ✓ | Read / public | **Passed** |
| WLPaused | ✓ | Read / public | **Passed** |
| totalSupply | ✓ | Read / public | **Passed** |
| setRevealed | ✓ | Write / public | **Passed** |
| approve | ✓ | Write / public | **Passed** |
| safeTransferFrom | ✓ | Write / public | **Passed** |
| safeTransferFrom | ✓ | Write / public | **Passed** |
| setUriPrefix | ✓ | Write / public | **Passed** |
| mint | ✓ | Write / payable | **Passed** |
| transferOwnership | ✓ | Write / public | **Passed** |
| setApprovalForAll | ✓ | Write / public | **Passed** |
| transferFrom | ✓ | Write / public | **Passed** |
| setPaused | ✓ | Write / public | **Passed** |
| setWhitelistMerkleRoot | ✓ | Write / public | **Passed** |
| setWLCost | ✓ | Write / public | **Passed** |
| renounceOwnership | ✓ | Write / public | **Passed** |
| withdraw | ✓ | Write / public | **Passed** |
| whitlistMint | ✓ | Write / payable | **Passed** |
| setCost | ✓ | Write / public | **Passed** |

| | | | |
|---|---|---|---|
| setWLPaused | ✓ | Write / public | **Passed** |
| Reserve | ✓ | Write / public | **Passed** |
| setHiddenMetadataUri | ✓ | Write / public | **Passed** |
| setMaxMintAmountPerTx | ✓ | Write / public | **Passed** |
| setMaxTxPerWlAddress | ✓ | 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 with Notes** |
| 7 | Integer Overflow and Underflow. | **Passed** |
| 8 | DoS with Revert. | **Passed** |
| 9 | DoS with block gas limit. | **Passed** |
| 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,<br>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:

#Missing zero address validation

Description

When the owner wants to Reserve for the investors it has to check for the zero address to make, he didn't mint for the burn address. Otherwise, the mint function will act like the burn function.

```
function Reserve(uint16 _mintAmount, address _receiver) external onlyOwner {
    uint16 totalSupply = uint16(_owners.length);
    require(totalSupply + _mintAmount <= maxSupply, "Excedes max supply.");
    for(uint16 i; i < _mintAmount; i++) {
    _mint(_receiver , totalSupply + i);
     }
     delete _mintAmount;
     delete _receiver;
     delete totalSupply;
  }
```

Remediation

Use the require statement to check for zero addresses.

```
require(_receiver!= address(0), "Not Mint for the zero address");
```

Status: Closed. Fixed in version2.

#Multiple pragma statements

| Line | Pragma |
|---|---|
| 7 | pragma solidity ^0.8.0; |
| 65 | pragma solidity ^0.8.0; |
| 104 | pragma solidity ^0.8.0; |
| 131 | pragma solidity ^0.8.1; |
| 209 | pragma solidity ^0.8.0; |

| | |
|---|---|
| 239 | pragma solidity ^0.8.0; |
| 267 | pragma solidity ^0.8.0; |
| 298 | pragma solidity ^0.8.0; |
| 443 | pragma solidity ^0.8.0; |
| 474 | pragma solidity ^0.8.0; |
| 502 | pragma solidity ^0.8.7; |
| 963 | pragma solidity ^0.8.7; |
| 1011 | pragma solidity ^0.8.7; |

Description

There are multiple pragma statements in the code. Only the compiler version 0.8.7 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

#Owner privileges (In the period when the owner isn't renounced)
Description

The owner can pause and un Pause mint.
The owner can pause and un Pause for whitelist mint.
The owner can change the price in WL or non WL stage.

```
function setRevealed() external onlyOwner {
    reveal = !reveal;
  }
   function setWLPaused() external onlyOwner {
    WLpaused = !WLpaused;
  }
function setPaused() external onlyOwner {
    paused = !paused;
  }
  function setCost(uint _cost) external onlyOwner{
      cost = _cost;
  }
```

Remediation

Make these functions internal in next version or the team should announce the investors before pause and un pause to give them time if they want to do anything.
P.S: This issue is common to the majority of NFT smart contracts.
Status: Acknowledged.

#Missing require statement in reserve

Description

When the owner wants to control the Reserve function because the developer add function allows the owner to pause/un-pause the reserved mint but the developer had missed adding the required statement to check if the owner has paused or un-paused the reserve the function.

```
function Reserve(uint16 _mintAmount, address _receiver) external onlyOwner {
    uint16 totalSupply = uint16(_owners.length);
    require(totalSupply + _mintAmount <= maxSupply, "Excedes max supply.");
    for(uint16 i; i < _mintAmount; i++) {
    _mint(_receiver , totalSupply + i);
     }
     delete _mintAmount;
     delete _receiver;
     delete totalSupply;
  }
```

Remediation

Use the require statement to check for pausing the function.

```
require(!reveal, "Reveal is not paused!");
```

Status: Closed. Fixed in version2.

**Very Low:**

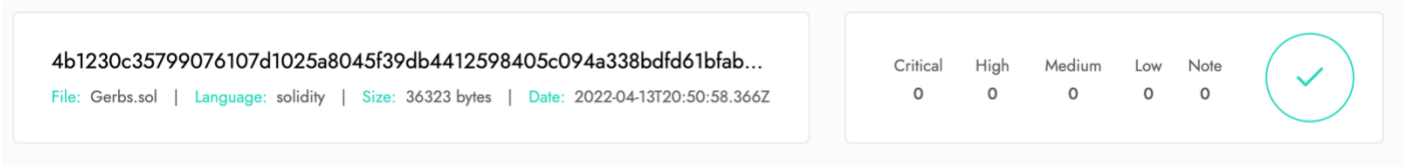
No Very Low severity vulnerabilities were found.

**Notes:**

No Notes were found.

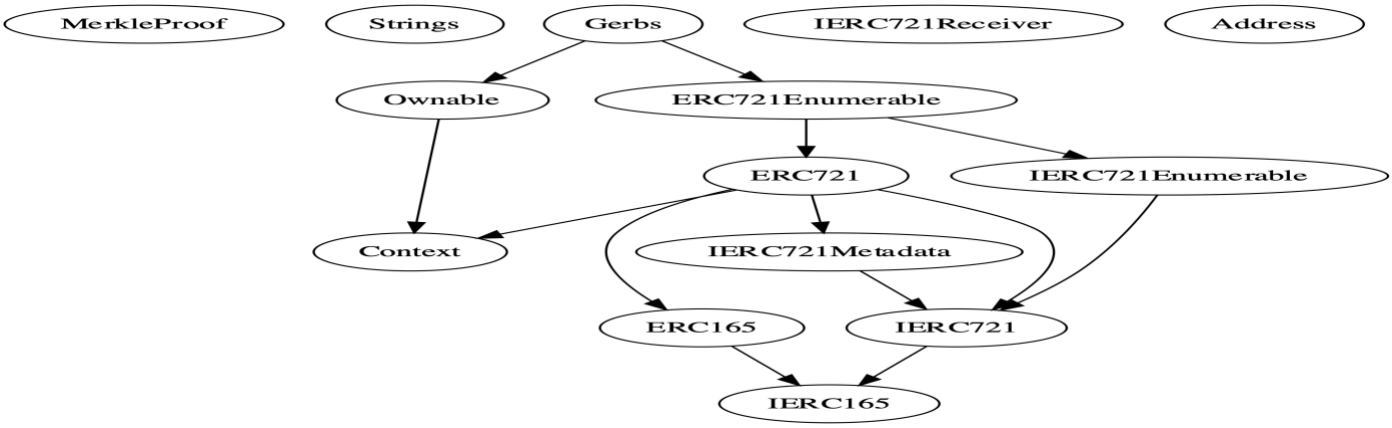
# Automatic Testing

1- Check for security

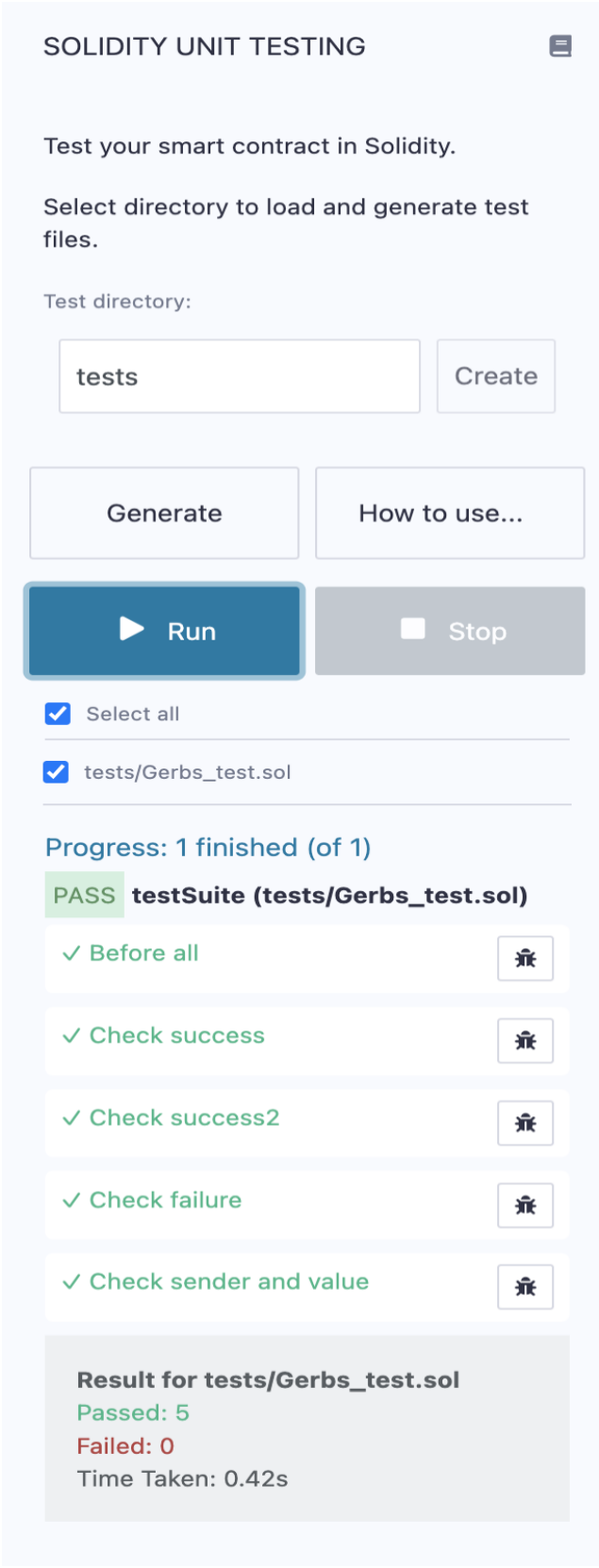



2- SOLIDITY STATIC ANALYSIS

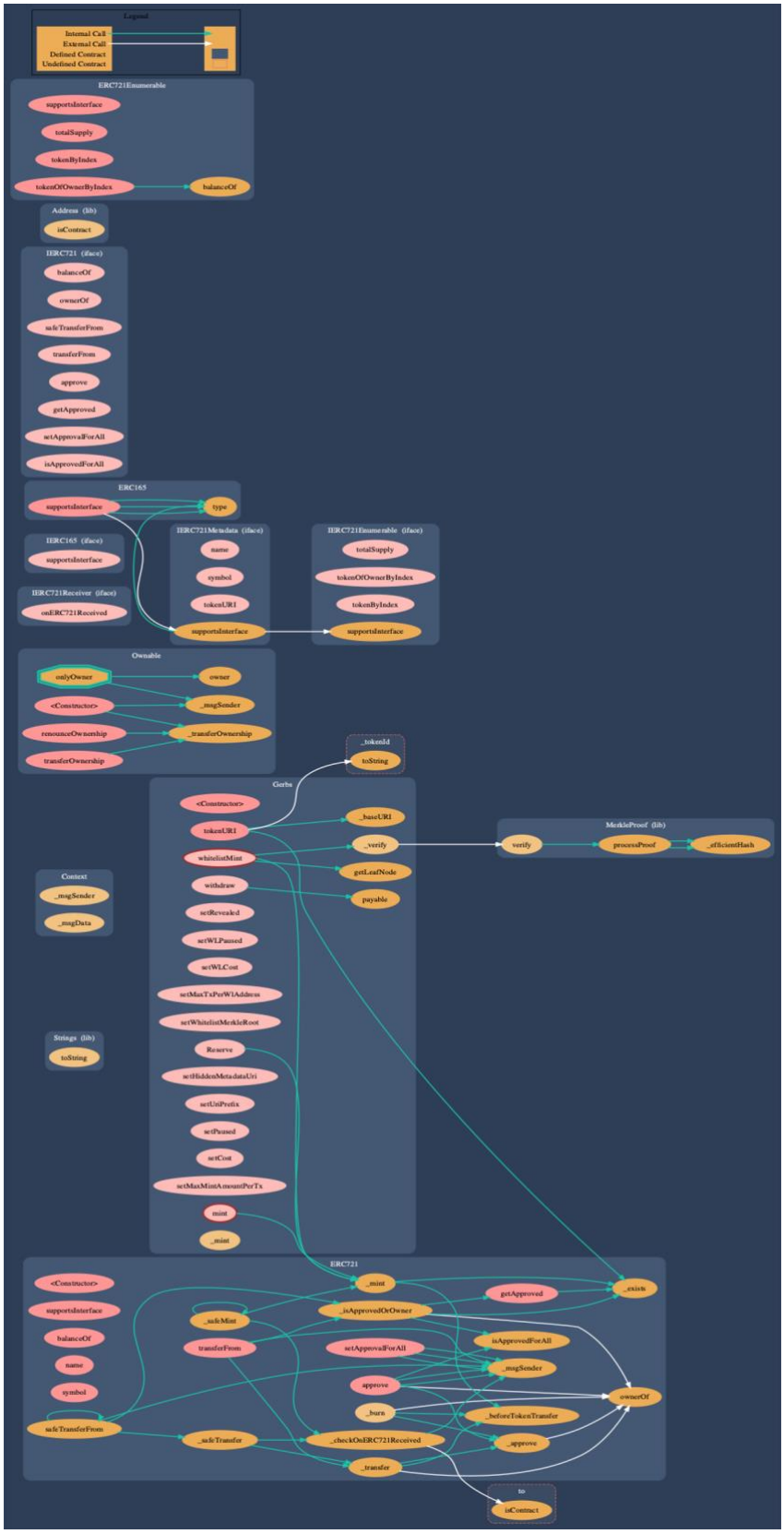

3- Inheritance graph



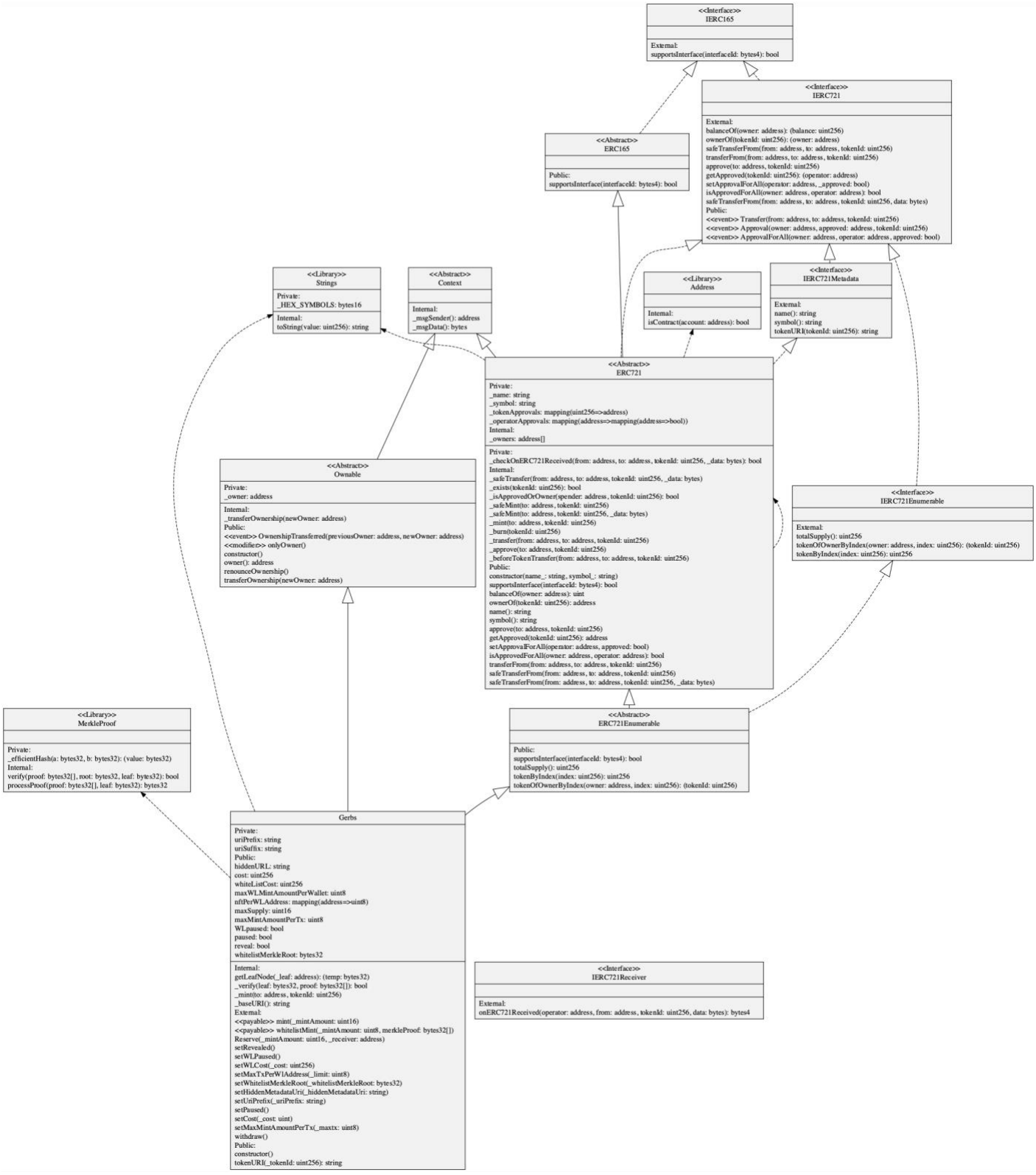
# 4- SOLIDITY UNIT TESTING



5- Call graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
ERC721Enumerable
supportsInterface
totalSupply
tokenByIndex
tokenOfOwnerByIndex
balanceOf
Address (lib)
isContract
IERC721 (iface)
balanceOf
ownerOf
safeTransferFrom
transferFrom
approve
getApproved
setApprovalForAll
isApprovedForAll
ERC165
supportsInterface
type
IERC165 (iface)
supportsInterface
IERC721Metadata (iface)
name
symbol
tokenURI
supportsInterface
IERC721Enumerable (iface)
totalSupply
tokenOfOwnerByIndex
tokenByIndex
supportsInterface
IERC721Receiver (iface)
onERC721Received
Ownable
onlyOwner
owner
<Constructor>
_msgSender
renounceOwnership
_transferOwnership
transferOwnership
_tokenId
toString
Gerbs
<Constructor>
tokenURI
whitelistMint
withdraw
setRevealed
setWLPaused
setWLCost
setMaxTxPerWlAddress
setWhitelistMerkleRoot
Reserve
setHiddenMetadataUri
setUriPrefix
setPaused
setCost
setMaxMintAmountPerTx
mint
_mint
_baseURI
_verify
getLeafNode
payable
MerkleProof (lib)
verify
processProof
_efficientHash
Context
_msgSender
_msgData
Strings (lib)
toString
ERC721
<Constructor>
supportsInterface
balanceOf
name
symbol
safeTransferFrom
_safeMint
transferFrom
_safeTransfer
_mint
_isApprovedOrOwner
setApprovalForAll
approve
_burn
_transfer
_checkOnERC721Received
getApproved
_exists
isApprovedForAll
_msgSender
ownerOf
_beforeTokenTransfer
_approve
to
isContract

# Unified Modeling Language (UML)



# Functions signature

```
Sighash   |   Function Signature
========================
16279055  =>  isContract(address)
58381669  =>  whitelistMint(uint8,bytes32[])
5a9a49c7  =>  verify(bytes32[],bytes32,bytes32)
62702a6b  =>  processProof(bytes32[],bytes32)
41ed615b  =>  _efficientHash(bytes32,bytes32)
6900a3ae  =>  toString(uint256)
119df25f  =>  _msgSender()
8b49d47e  =>  _msgData()
8da5cb5b  =>  owner()
715018a6  =>  renounceOwnership()
f2fde38b  =>  transferOwnership(address)
d29d44ee  =>  _transferOwnership(address)
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)
18160ddd  =>  totalSupply()
2f745c59  =>  tokenOfOwnerByIndex(address,uint256)
4f6ccce7  =>  tokenByIndex(uint256)
06fdde03  =>  name()
95d89b41  =>  symbol()
c87b56dd  =>  tokenURI(uint256)
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)
1fd01de1  =>  _checkOnERC721Received(address,address,uint256,bytes)
cad3be83  =>  _beforeTokenTransfer(address,address,uint256)
23cf0a22  =>  mint(uint16)
2f6f98e1  =>  Reserve(uint16,address)
3bd64968  =>  setRevealed()
093cfa63  =>  setWLPaused()
d1d19213  =>  setWLCost(uint256)
63937fe0  =>  setMaxTxPerWlAddress(uint8)
bd32fb66  =>  setWhitelistMerkleRoot(bytes32)
bbfb564a  =>  getLeafNode(address)
46f265fd  =>  _verify(bytes32,bytes32[])
4fdd43cb  =>  setHiddenMetadataUri(string)
7ec4a659  =>  setUriPrefix(string)
```

```
37a66d85  =>  setPaused()
44a0d68a  =>  setCost(uint256)
aa062290  =>  setMaxMintAmountPerTx(uint8)
3ccfd60b  =>  withdraw()
743976a0  =>  _baseURI()
```

# Automatic general report

```
Files Description Table

|  File Name  |  SHA-1 Hash  |
|-------------|--------------|
| /Users/macbook/Desktop/smart contracts/Gerbs.sol |
18b37186e95520fa6cbc32524e5cdc6775f71424 |

 Contracts Description Table

|  Contract  |         Type        |       Bases      |                  |
|
|:----------:|:-------------------:|:----------------:|:----------------:|:--------
-------:|
|     └      |  **Function Name**  |  **Visibility**  |  **Mutability**  |
**Modifiers**  |
||||||
| **MerkleProof** | Library |  |||
| └ | verify | Internal 🔒 |  | |
| └ | processProof | Internal 🔒 |  | |
| └ | _efficientHash | Private 🔐 |  | |
||||||
| **Strings** | Library |  |||
| └ | toString | Internal 🔒 |  | |
||||||
| **Context** | Implementation |  |||
| └ | _msgSender | Internal 🔒 |  | |
| └ | _msgData | Internal 🔒 |  | |
||||||
| **Ownable** | Implementation | Context |||
| └ | <Constructor> | Public ❗ | 🛑 |NO❗ |
| └ | owner | Public ❗ |  |NO❗ |
| └ | renounceOwnership | Public ❗ | 🛑 | onlyOwner |
| └ | transferOwnership | Public ❗ | 🛑 | onlyOwner |
| └ | _transferOwnership | Internal 🔒 | 🛑 | |
||||||
| **IERC721Receiver** | Interface |  |||
| └ | onERC721Received | External ❗ | 🛑 |NO❗ |
||||||
| **IERC165** | Interface |  |||
| └ | supportsInterface | External ❗ |  |NO❗ |
||||||
| **ERC165** | Implementation | IERC165 |||
| └ | supportsInterface | Public ❗ |  |NO❗ |
||||||
| **IERC721** | Interface | IERC165 |||
| └ | balanceOf | External ❗ |  |NO❗ |
| └ | ownerOf | External ❗ |  |NO❗ |
| └ | safeTransferFrom | External ❗ | 🛑 |NO❗ |
| └ | transferFrom | External ❗ | 🛑 |NO❗ |
| └ | approve | External ❗ | 🛑 |NO❗ |
| └ | getApproved | External ❗ |  |NO❗ |
| └ | setApprovalForAll | External ❗ | 🛑 |NO❗ |
```

| └ | isApprovedForAll | External ❗ | | NO❗ |
| └ | safeTransferFrom | External ❗ | 🛑 | NO❗ |
|||||
| **IERC721Enumerable** | Interface | IERC721 |||
| └ | totalSupply | External ❗ | | NO❗ |
| └ | tokenOfOwnerByIndex | External ❗ | | NO❗ |
| └ | tokenByIndex | External ❗ | | NO❗ |
|||||
| **IERC721Metadata** | Interface | IERC721 |||
| └ | name | External ❗ | | NO❗ |
| └ | symbol | External ❗ | | NO❗ |
| └ | tokenURI | External ❗ | | NO❗ |
|||||
| **Address** | Library | | |||
| └ | isContract | Internal 🔒 | | |
|||||
| **ERC721** | Implementation | Context, ERC165, IERC721, IERC721Metadata |||
| └ | <Constructor> | Public ❗ | 🛑 | NO❗ |
| └ | supportsInterface | Public ❗ | | NO❗ |
| └ | balanceOf | Public ❗ | | NO❗ |
| └ | ownerOf | Public ❗ | | NO❗ |
| └ | name | Public ❗ | | NO❗ |
| └ | symbol | Public ❗ | | NO❗ |
| └ | approve | Public ❗ | 🛑 | NO❗ |
| └ | getApproved | Public ❗ | | NO❗ |
| └ | setApprovalForAll | Public ❗ | 🛑 | NO❗ |
| └ | isApprovedForAll | Public ❗ | | NO❗ |
| └ | transferFrom | Public ❗ | 🛑 | NO❗ |
| └ | safeTransferFrom | Public ❗ | 🛑 | NO❗ |
| └ | safeTransferFrom | Public ❗ | 🛑 | NO❗ |
| └ | _safeTransfer | Internal 🔒 | 🛑 | |
| └ | _exists | Internal 🔒 | | |
| └ | _isApprovedOrOwner | Internal 🔒 | | |
| └ | _safeMint | Internal 🔒 | 🛑 | |
| └ | _safeMint | Internal 🔒 | 🛑 | |
| └ | _mint | Internal 🔒 | 🛑 | |
| └ | _burn | Internal 🔒 | 🛑 | |
| └ | _transfer | Internal 🔒 | 🛑 | |
| └ | _approve | Internal 🔒 | 🛑 | |
| └ | _checkOnERC721Received | Private 🔐 | 🛑 | |
| └ | _beforeTokenTransfer | Internal 🔒 | 🛑 | |
|||||
| **ERC721Enumerable** | Implementation | ERC721, IERC721Enumerable |||
| └ | supportsInterface | Public ❗ | | NO❗ |
| └ | totalSupply | Public ❗ | | NO❗ |
| └ | tokenByIndex | Public ❗ | | NO❗ |
| └ | tokenOfOwnerByIndex | Public ❗ | | NO❗ |
|||||
| **Gerbs** | Implementation | ERC721Enumerable, Ownable |||
| └ | <Constructor> | Public ❗ | 🛑 | ERC721 |
| └ | mint | External ❗ | 💸 | NO❗ |
| └ | Reserve | External ❗ | 🛑 | onlyOwner |
| └ | tokenURI | Public ❗ | | NO❗ |
| └ | setRevealed | External ❗ | 🛑 | onlyOwner |
| └ | setWLPaused | External ❗ | 🛑 | onlyOwner |

| └ | setWLCost | External ❗ | 🛑 | onlyOwner |
| --- | --- | --- | --- | --- |
| └ | setMaxTxPerWlAddress | External ❗ | 🛑 | onlyOwner |
| └ | setWhitelistMerkleRoot | External ❗ | 🛑 | onlyOwner |
| └ | getLeafNode | Internal 🔒 | | |
| └ | _verify | Internal 🔒 | | |
| └ | whitelistMint | External ❗ | 💵 | NO❗ |
| └ | setHiddenMetadataUri | External ❗ | 🛑 | onlyOwner |
| └ | setUriPrefix | External ❗ | 🛑 | onlyOwner |
| └ | setPaused | External ❗ | 🛑 | onlyOwner |
| └ | setCost | External ❗ | 🛑 | onlyOwner |
| └ | setMaxMintAmountPerTx | External ❗ | 🛑 | onlyOwner |
| └ | withdraw | External ❗ | 🛑 | onlyOwner |
| └ | _mint | Internal 🔒 | 🛑 | |
| └ | _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 “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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