

# Smart Contract Security Audit V1

## Warrant Smart Contract

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<https://saferico.com/>

[business@saferico.com](mailto:business@saferico.com)

[https://t.me/SFI\\_ANN](https://t.me/SFI_ANN)

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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:** 0x68daca65e822706208782cefb3cb09c5d3a3d716
- **Code:**  
<https://github.com/Saferico/Smart-Contracts-for-Projects/blob/main/warrant.sol>

## NFT Information

- Name: KaiWarrant
- MAX Supply: 2500
- Holders:
- Total transactions:

Contracts address deployed to test net (Ethereum )

KaiWarrant smart contract on Ethereum test net to test every function by the auditor.

<https://rinkeby.etherscan.io/address/0x68daca65e822706208782cefb3cb09c5d3a3d716>

## Executive Summary

According to our assessment, the customer`s solidity smart contract is **“WELL SECURED”**. The team has fixed the low-level 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, 3 low, 0 very low-level issues and 0 note in all solidity files of the contract

The files:

KaiWarrant.sol

# File and Function Level Report

## File in Scope:

Contract Name	SHA 256 hash	Contract Address
KaiWarrant.sol	27954c0f5811956408242e97614a86a4564c19536467f2db07ef56f9bbdf8c52	0x68daca65e822706208782cefb3cb09c5d3a3d716

- Contract: KaiWarrant
- Inherit: ERC1155, Ownable, ERC1155Burnable, ERC1155Supply
- Observation: All passed including security check
- Test Report: passed
- Score: passed
- Conclusion: passed

Function	Test Result	Type / Return Type	Score
mintedCounter	✓	Read / public	<b>Passed</b>
uri	✓	Read / public	<b>Passed</b>
privateSigner	✓	Read / public	<b>Passed</b>
supportsInterface	✓	Read / public	<b>Passed</b>
privateSigWord	✓	Read / public	<b>Passed</b>
balanceOf	✓	Read / public	<b>Passed</b>
Owner	✓	Read / public	<b>Passed</b>
privateMinters	✓	Read / public	<b>Passed</b>
privatePrice	✓	Read / public	<b>Passed</b>
getApprovedForAll	✓	Read / public	<b>Passed</b>
redeemRegularPrice	✓	Read / public	<b>Passed</b>
getApproved	✓	Read / public	<b>Passed</b>

totalSupply	✓	Read / public	<b>Passed</b>
maxSupply	✓	Read / public	<b>Passed</b>
kaiContract	✓	Read / public	<b>Passed</b>
redeemLive	✓	Read / public	<b>Passed</b>
balanceOfBatch	✓	Read / public	<b>Passed</b>
redeemPlatinumPrice	✓	Read / public	<b>Passed</b>
exists	✓	Read / public	<b>Passed</b>
maxPerWallet	✓	Read / public	<b>Passed</b>
mintedCounter	✓	Read / public	<b>Passed</b>
redeemPlatinum	✓	Write / payable	<b>Passed</b>
approve	✓	Write / public	<b>Passed</b>
safeBatchTransferFrom	✓	Write / public	<b>Passed</b>
safeTransferFrom	✓	Write / public	<b>Passed</b>
founderMint	✓	Write / public	<b>Passed</b>
withdraw	✓	Write / public	<b>Passed</b>
gift	✓	Write / public	<b>Passed</b>
transferOwnership	✓	Write / public	<b>Passed</b>
setApprovalForAll	✓	Write / public	<b>Passed</b>
setPlatinumPrice	✓	Write / public	<b>Passed</b>
privateMint	✓	Write / payable	<b>Passed</b>
renounceOwnership	✓	Write / public	<b>Passed</b>
setURI	✓	Write / public	<b>Passed</b>
setKaiAddress	✓	Write / public	<b>Passed</b>
setMaxPerWallet	✓	Write / public	<b>Passed</b>
setMax	✓	Write / public	<b>Passed</b>
setPrice	✓	Write / public	<b>Passed</b>
burnBatch	✓	Write / public	<b>Passed</b>

setRegularPrice	✓	Write / public	<b>Passed</b>
setSigner	✓	Write / public	<b>Passed</b>
redeemRegular	✓	Write / payable	<b>Passed</b>
togglePrivateStatus	✓	Write / public	<b>Passed</b>
burn	✓	Write / public	<b>Passed</b>
toggleRedeemStatus	✓	Write / public	<b>Passed</b>

## 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:

### #Missing zero address validation

#### Description

When the owner wants to mint NFTs for investors as gifts, he has to check for the zero address to make, he didn't mint for the zero address. Otherwise, the gift function will act like burn function. When he wants to change signer address, he has to check too.

```
function gift(address[] calldata receivers, uint256 tokenId)
    external
    onlyOwner
{
    require(
        mintedCounter + receivers.length <= maxSupply,
        "EXCEED_SALE_SUPPLY"
    );
    for (uint256 i = 0; i < receivers.length; i++) {
        mintedCounter++;
        _mint(receivers[i], tokenId, 1, "");
    }
}

function setSigner(address newAddress) external onlyOwner {
    privateSigner = newAddress;
}

function setKaiAddress(address newAddress) external onlyOwner {
    kaiContract = IKAI(newAddress);
}
```

#### Remediation

Use the require statement to check for zero addresses.

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

## #Multiple pragma statements

Line	Pragma
17	pragma solidity ^0.8.0;
96	pragma solidity ^0.8.0;
315	pragma solidity ^0.8.0;
343	pragma solidity ^0.8.0;
427	pragma solidity ^0.8.1;
652	pragma solidity ^0.8.0;
681	pragma solidity ^0.8.0;
711	pragma solidity ^0.8.0;
771	pragma solidity ^0.8.0;
898	pragma solidity ^0.8.0;
922	pragma solidity ^0.8.0;
1441	pragma solidity ^0.8.0;
1507	pragma solidity ^0.8.0;
1556	pragma solidity ^0.8.7;

### Description

There are multiple pragma statements in the code. The newest compiler version 0.8.17 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 mint the NFT to any address.

The owner can pause and un pause the contract.

The owner can change the price.

```
function togglePrivateStatus() external onlyOwner {
    privateLive = !privateLive;
}
```

```
function toggleRedeemStatus() external onlyOwner {
    redeemLive = !redeemLive;
}
```

```
function gift(address[] calldata receivers) external onlyOwner {
    require(
        teamMintedCounter + receivers.length <= maxTeamSupply,
```

```

        "EXCEED_TEAM_SUPPLY"
    );

    teamMintedCounter += receivers.length;
    for (uint256 i = 0; i < receivers.length; i++) {
        _mint(receivers[i], 1);
    }
}

function setPrice(uint256 newPrice) external onlyOwner {
    price = newPrice;
}

function setPlatinumPrice(uint256 newPrice) external onlyOwner {
    redeemPlatinumPrice = newPrice;
}

function setRegularPrice(uint256 newPrice) external onlyOwner {
    redeemRegularPrice = newPrice;
}

```

#### Remediation

Make these functions internal in next version or the team should announce the investors before doing anything 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**.

#### Very Low:

No Very Low severity vulnerabilities were found.

#### Notes:

No Notes vulnerabilities were found.

# Automatic Testing

## 1- Check for security

27954c0f5811956408242e97614a86a4564c19536467f2db07ef56f9bbdf8c52

File: warrant.... | Language: solidity | Size: 60014 bytes | Date: 2022-10-03T06:35:49.761Z

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

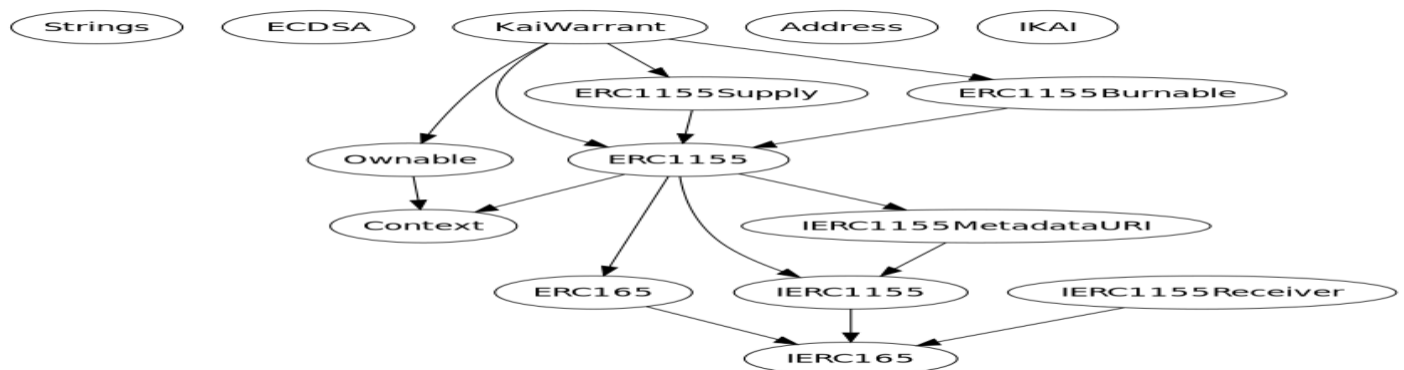
- ☒ ERC20:  
'decimals' should be 'uint8'

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/warrant\_test.sol

Progress: 1 finished (of 1)

PASS

 testSuite (tests/warrant\_test.sol)

✓ Before all

⛔

✓ Check success

⛔

✓ Check success2

⛔

✓ Check failure

⛔

✓ Check sender and value

⛔

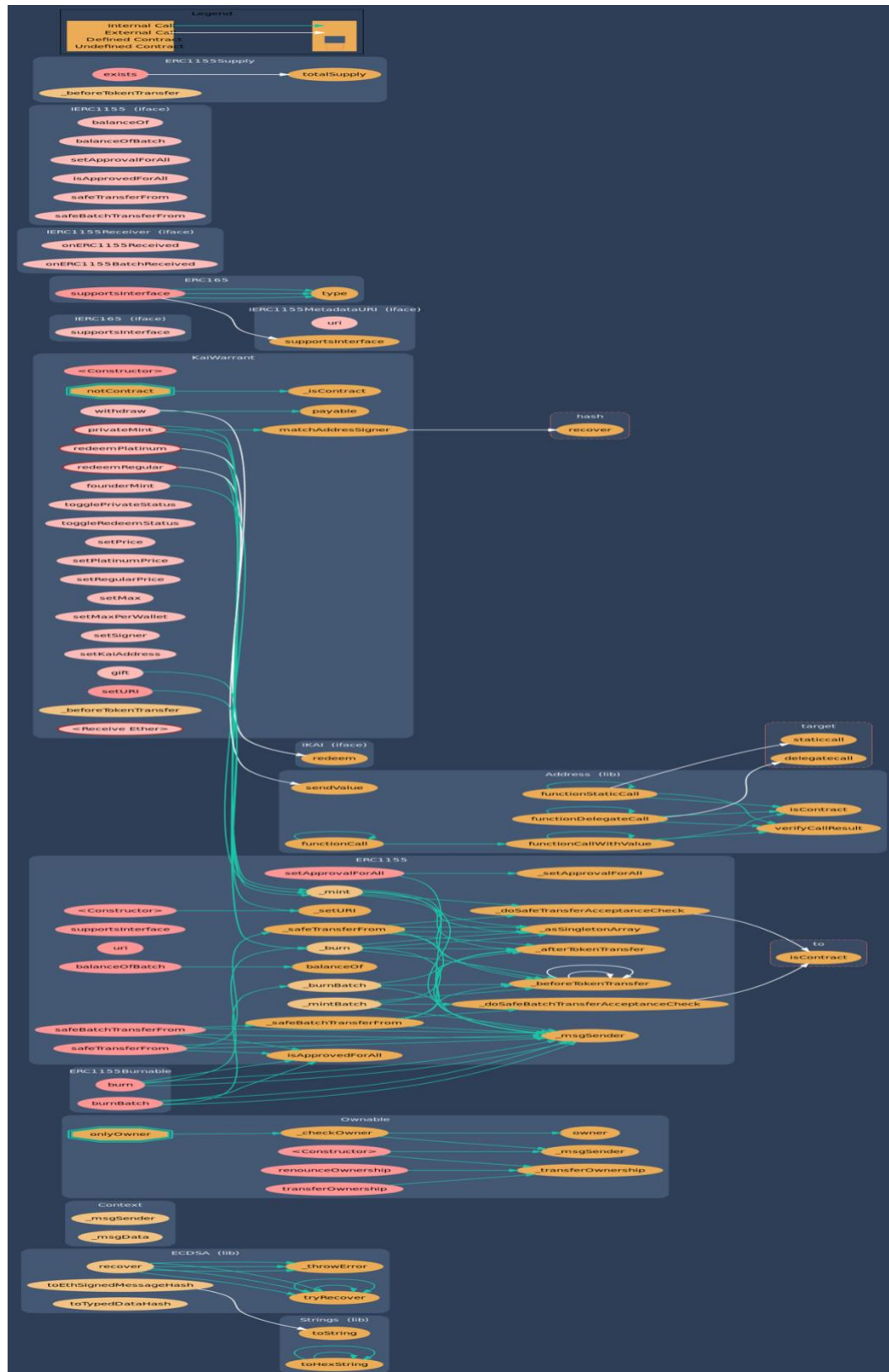
**Result for tests/warrant\_test.sol**

Passed: 5

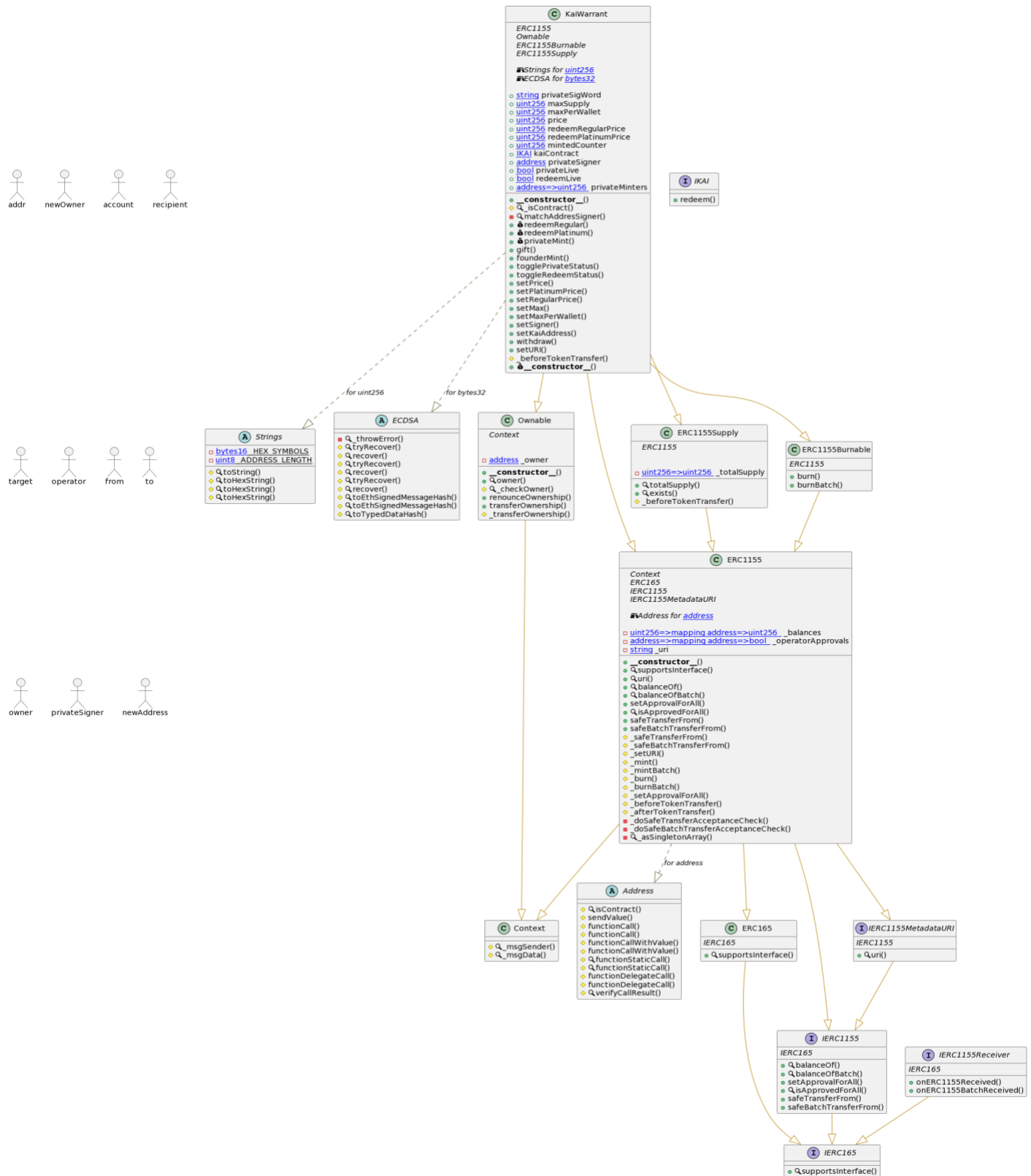
Failed: 0

Time Taken: 0.25s

## 5- Call graph



# Unified Modeling Language (UML)





## Functions signature

Sighash	Function Signature
=====	
16279055	=> isContract (address)
6900a3ae	=> toString (uint256)
8fba8d5c	=> toHexString (uint256)
63e1cbea	=> toHexString (uint256, uint256)
1bb0c665	=> toHexString (address)
5e2ffa14	=> _throwError (RecoverError)
c6edd8a7	=> tryRecover (bytes32, bytes)
19045a25	=> recover (bytes32, bytes)
628f98cc	=> tryRecover (bytes32, bytes32, bytes32)
bf2fe7fd	=> recover (bytes32, bytes32, bytes32)
4d78da76	=> tryRecover (bytes32, uint8, bytes32, bytes32)
c2bf17b0	=> recover (bytes32, uint8, bytes32, bytes32)
918a15cf	=> toEthSignedMessageHash (bytes32)
92bd87b5	=> toEthSignedMessageHash (bytes)
7df7a71c	=> toTypedDataHash (bytes32, bytes32)
119df25f	=> _msgSender ()
8b49d47e	=> _msgData ()
8da5cb5b	=> owner ()
53a72975	=> _checkOwner ()
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)
01ffc9a7	=> supportsInterface (bytes4)
f23a6e61	=> onERC1155Received (address, address, uint256, uint256, bytes)
bc197c81	=> onERC1155BatchReceived (address, address, uint256[], uint256[], bytes)
00fdd58e	=> balanceOf (address, uint256)
4e1273f4	=> balanceOfBatch (address[], uint256[])
a22cb465	=> setApprovalForAll (address, bool)
e985e9c5	=> isApprovedForAll (address, address)
f242432a	=> safeTransferFrom (address, address, uint256, uint256, bytes)
2eb2c2d6	=> safeBatchTransferFrom (address, address, uint256[], uint256[], bytes)
0e89341c	=> uri (uint256)
8e8a7590	=> _safeTransferFrom (address, address, uint256, uint256, bytes)
4f2999a7	=> _safeBatchTransferFrom (address, address, uint256[], uint256[], bytes)
f392d4f5	=> _setURI (string)
2ca6f4da	=> _mint (address, uint256, uint256, bytes)
b6ea6b0a	=> _mintBatch (address, uint256[], uint256[], bytes)
464a5ffb	=> _burn (address, uint256, uint256)
f3323d3c	=> _burnBatch (address, uint256[], uint256[])
8c4e3f32	=> _setApprovalForAll (address, address, bool)
fe49010b	=>

```
_beforeTokenTransfer(address,address,address,uint256[],uint256[],bytes)
6024ca4a =>
_afterTokenTransfer(address,address,address,uint256[],uint256[],bytes)
084e9e24 =>
_doSafeTransferAcceptanceCheck(address,address,address,uint256,uint256,bytes)
e51c223d =>
_doSafeBatchTransferAcceptanceCheck(address,address,address,uint256[],uint256[],byt
es)
136ad9d4 => _asSingletonArray(uint256)
bd85b039 => totalSupply(uint256)
4f558e79 => exists(uint256)
f5298aca => burn(address,uint256,uint256)
6b20c454 => burnBatch(address,uint256[],uint256[])
1e9a6950 => redeem(address,uint256)
7d48441f => _isContract(address)
821dc225 => matchAddressSigner(bytes)
7dfa8ffb => redeemRegular(uint256)
2c006d4d => redeemPlatinum(uint256)
92eca5b4 => privateMint(uint256,bytes)
c0f4af70 => gift(address[],uint256)
c5de46d1 => founderMint(uint256,uint256)
c46eb685 => togglePrivateStatus()
d4434330 => toggleRedeemStatus()
91b7f5ed => setPrice(uint256)
c061f79e => setPlatinumPrice(uint256)
fdab4d5e => setRegularPrice(uint256)
1fe9eabc => setMax(uint256)
e268e4d3 => setMaxPerWallet(uint256)
6c19e783 => setSigner(address)
62e1d117 => setKaiAddress(address)
3ccfd60b => withdraw()
02fe5305 => setURI(string)
```

# Automatic general report

## Files Description Table

```
| File Name | SHA-1 Hash |
|-----|-----|
| /Users/macbook/Desktop/smart contracts/warrant.sol |
73019f1a11e979e5db98be786c4921f760e8a37c |
```

## Contracts Description Table

Contract	Type	Bases																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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| L | functionCallWithValue | Internal  |  | |
| L | functionStaticCall | Internal  | | |
| L | functionStaticCall | Internal  | | |
| L | functionDelegateCall | Internal  |  | |
| L | functionDelegateCall | Internal  |  | |
| L | verifyCallResult | Internal  | | |
| | | |
| **IERC165** | Interface | | |
| L | supportsInterface | External  | | NO  |
| | | |
| **ERC165** | Implementation | IERC165 | | |
| L | supportsInterface | Public  | | NO  |
| | | |
| **IERC1155Receiver** | Interface | IERC165 | | |
| L | onERC1155Received | External  |  | NO  |
| L | onERC1155BatchReceived | External  |  | NO  |
| | | |
| **IERC1155** | Interface | IERC165 | | |
| L | balanceOf | External  | | NO  |
| L | balanceOfBatch | External  | | NO  |
| L | setApprovalForAll | External  |  | NO  |
| L | isApprovedForAll | External  | | NO  |
| L | safeTransferFrom | External  |  | NO  |
| L | safeBatchTransferFrom | External  |  | NO  |
| | | |
| **IERC1155MetadataURI** | Interface | IERC1155 | | |
| L | uri | External  | | NO  |
| | | |
| **ERC1155** | Implementation | Context, ERC165, IERC1155, IERC1155MetadataURI | | |
| L | <Constructor> | Public  |  | NO  |
| L | supportsInterface | Public  | | NO  |
| L | uri | Public  | | NO  |
| L | balanceOf | Public  | | NO  |
| L | balanceOfBatch | Public  | | NO  |
| L | setApprovalForAll | Public  |  | NO  |
| L | isApprovedForAll | Public  | | NO  |
| L | safeTransferFrom | Public  |  | NO  |
| L | safeBatchTransferFrom | Public  |  | NO  |
| L | _safeTransferFrom | Internal  |  |  |
| L | _safeBatchTransferFrom | Internal  |  |  |
| L | _setURI | Internal  |  | |
| L | _mint | Internal  |  | |
| L | _mintBatch | Internal  |  | |
| L | _burn | Internal  |  | |
| L | _burnBatch | Internal  |  | |
| L | _setApprovalForAll | Internal  |  |  |
| L | _beforeTokenTransfer | Internal  |  |  |
| L | _afterTokenTransfer | Internal  |  |  |
| L | _doSafeTransferAcceptanceCheck | Private  |  |  |
| L | _doSafeBatchTransferAcceptanceCheck | Private  |  |  |
| L | _asSingletonArray | Private  | | |
| | | |
| **ERC1155Supply** | Implementation | ERC1155 | | |
| L | totalSupply | Public  | | NO  |
| L | exists | Public  | | NO  |

```

```

| L | _beforeTokenTransfer | Internal 🔒 | 🔒 | |
| | | | |
| **ERC1155Burnable** | Implementation | ERC1155 | | |
| L | burn | Public ! | 🔒 | NO! |
| L | burnBatch | Public ! | 🔒 | NO! |
| | | | |
| **IKAI** | Interface | | | |
| L | redeem | External ! | 🔒 | NO! |
| | | | |
| **KaiWarrant** | Implementation | ERC1155, Ownable, ERC1155Burnable,
ERC1155Supply | | |
| L | <Constructor> | Public ! | 🔒 | ERC1155 |
| L | _isContract | Internal 🔒 | | |
| L | matchAddressSigner | Private 🔒 | | |
| L | redeemRegular | External ! | 💰 | notContract |
| L | redeemPlatinum | External ! | 💰 | notContract |
| L | privateMint | External ! | 💰 | notContract |
| L | gift | External ! | 🔒 | onlyOwner |
| L | founderMint | External ! | 🔒 | onlyOwner |
| L | togglePrivateStatus | External ! | 🔒 | onlyOwner |
| L | toggleRedeemStatus | External ! | 🔒 | onlyOwner |
| L | setPrice | External ! | 🔒 | onlyOwner |
| L | setPlatinumPrice | External ! | 🔒 | onlyOwner |
| L | setRegularPrice | External ! | 🔒 | onlyOwner |
| L | setMax | External ! | 🔒 | onlyOwner |
| L | setMaxPerWallet | External ! | 🔒 | onlyOwner |
| L | setSigner | External ! | 🔒 | onlyOwner |
| L | setKaiAddress | External ! | 🔒 | onlyOwner |
| L | withdraw | External ! | 🔒 | onlyOwner |
| L | setURI | Public ! | 🔒 | onlyOwner |
| L | _beforeTokenTransfer | Internal 🔒 | 🔒 | |
| L | <Receive Ether> | External ! | 💰 | NO! |

```

### 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.
- ✓ No many high severity issues were found.
- ✓ Low (or very low) level issues have been fixed.

# 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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