Smart Contract Security Audit V1

Access Control Smart Contract Audit

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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**: Binance Smart Chain
- **Name**: AccessControl
- **Language** : Solidity
- **Contract Address**: 0x889713278cd537a0a4de236b26ec0f4afab82842, 0x3a0a36a5df68047a1ea2510104914c3e5ab0358a
- **Code Source**: https://github.com/TerraDharitri/drt-pREWA/tree/main/contracts

AccessControl.sol

Role-Based Access Control

A Solidity smart contract for managing permissions in decentralized applications

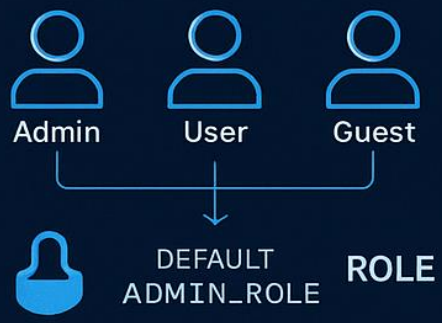
SaferICO

Solidity v0.8:28 | MIT License

Source: TerraDharitri/drt-pREWA on GItHub

What It Does

- Enables role-based access control (RBAC) for smart contracts
- Assigns roles to accounts to control who can perform specific actions
- Fiexible and secure, ideal for DAOs, DeFi, and governance systems.



Core Features

Roles
Defined by bytes82 (n. og DEFAULT. ADMIN_ROLE.

Dynamic Management
Grant revoke or renounce roles at runtme

Admin Hierarchy
Each role has an admin tole to manage it

Events
Track role cha -- nges with Role-Acminchanged, RoleGranted, RoleRevoked

Security
Restricted access via ontyRole

Main Functions

- **hasRole**(bytes32 role, accuont)
  Returns: bool
- **grantRole**(**bytes**32 role, address account
- **revokeRole**(**bytes**32 role, address account
- **renounceRole**(bytes32 role, account

How It's Used

- Decentralized governance (e.g, DAOs)
- DeFi protocols needing restricted functions
- Any dApp requiring granular permissions

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, 1 low, 0 very low-level issues and 1 note in all solidity files of the contract

The files:

AccessControl.sol

Audit Score:

100% secure

File and Function Level Report

File in Scope:

Contract Name	SHA 256 hash	Contract Address
AccessControl.sol	40163fa249f10365c03cf1fa9ddd26e2f6eb1005	0x889713278cd537a0a4de236b26ec0f4afab82842, 0x3a0a36a5df68047a1ea2510104914c3e5ab0358a

- Contract: AccessControl
- Inherit: Initializable, AccessControlStorage, IAccessControl
- Observation: All passed including security check
- Test Report: passed
- Score: passed
- Conclusion: passed

Function	Test Result	Type / Return Type	Score
DEFAULT_ADMIN_ROLE	✓	Read / public	**Passed**
EMERGENCY_ROLE	✓	Read / public	**Passed**
getRoleAdmin	✓	Read / public	**Passed**
getRoleMember	✓	Read / public	**Passed**
getRoleMembersPaginated	✓	Read / public	**Passed**
getRoleMembersCount	✓	Read / public	**Passed**
hasRole	✓	Read / public	**Passed**
PARAMETER_ROLE	✓	Read / public	**Passed**
MINTER_ROLE	✓	Read / public	**Passed**
PAUSER_ROLE	✓	Read / public	**Passed**
PROXY_ADMIN_ROLE	✓	Read / public	**Passed**
UPGRADER_ROLE	✓	Read / public	**Passed**
grantRole	✓	Write / public	**Passed**

initialize	✓	Write / public	**Passed**
renounceRole	✓	Write / public	**Passed**
revokeRole	✓	Write / public	**Passed**
setRoleAdmin	✓	Write / public	**Passed**

Issues Checking Status

SWC Attack Analysis

The Smart Contract Weakness Classification Registry (SWC Registry) is an implementation of the weakness classification scheme proposed in EIP-1470. It is loosely aligned to the terminologies and structure used in the Common Weakness Enumeration (CWE) for more info check https://swcregistry.io/

No.	Issue Description	Checking Status
136	Unencrypted Private Data On-Chain	**Passed**
135	Code With No Effects	**Passed**
134	Message call with hardcoded gas amount	**Passed**
133	Hash Collisions With Multiple Variable Length Arguments	**Passed**
132	Unexpected Ether balance	**Passed**
131	Presence of unused variables	**Passed**
130	Right-To-Left-Override control character (U+202E)	**Passed**
129	Typographical Error	**Passed**
128	DoS with block gas limit.	**Passed**
127	Arbitrary Jump with Function Type Variable	**Passed**
126	Insufficient Gas Griefing	**Passed**
125	Incorrect Inheritance Order	**Passed**
124	Write to Arbitrary Storage Location	**Passed**
123	Requirement Violation	**Passed**
122	Lack of Proper Signature Verification	**Passed**
121	Missing Protection against Signature Replay Attacks	**Passed**
120	Weak Sources of Randomness from Chain Attributes	**Passed**
119	Shadowing State Variables	**Passed**

118	Incorrect Constructor Name	**Passed**
117	Signature Malleability	**Passed**
116	Block values as a proxy for time	**Passed**
115	Authorization through tx.origin	**Passed**
114	Transaction Order Dependence	**Passed**
113	DoS with Failed Call	**Passed**
112	Delegatecall to Untrusted Callee	**Passed**
111	Use of Deprecated Solidity Functions	**Passed**
110	Assert Violation	**Passed**
109	Uninitialized Storage Pointer	**Passed**
108	State Variable Default Visibility	**Passed**
107	Reentrancy	**Passed**
106	Unprotected SELFDESTRUCT Instruction	**Passed**
105	Unprotected Ether Withdrawal	**Passed**
104	Unchecked Call Return Value	**Passed**
103	Floating Pragma	**Not Passed**
102	Outdated Compiler Version	**Passed**
101	Integer Overflow and Underflow	**Passed**
100	Function Default Visibility	**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:

#`hasRole` Reverts on Zero Address Account

Description: The `hasRole` function reverts with `AC_AccountInvalid()` if `account == address(0)`. While this is a valid check, typically a `hasRole` function returns `false` for a zero address or a non-existent account, rather than reverting. Reverting here might break off-chain tools or integrations expecting a boolean return for any input.

Recommendation : Change hasRole to return false for address(0) instead of reverting. This aligns with common patterns for has functions, If AC_AccountInvalid() is intended for other account checks in grantRole and revokeRole for general invalidity, it's fine there.

Status: Acknowledged.

Very Low:

No Very Low severity vulnerabilities were found.

Notes:

#Pragam version not fixed

Description

It is a good practice to lock the solidity version for a live deployment (use 0.8.28 instead of ^0.8.28). contracts should be deployed with the same compiler version and flags that they have been tested the most with. Locking the pragma helps ensure that contracts do not accidentally get deployed using, for example, the latest compiler which may have higher risks of undiscovered bugs. Contracts may also be deployed by others and the pragma indicates the compiler version intended by the original authors. And avoid Solidity compiler Bugs check here

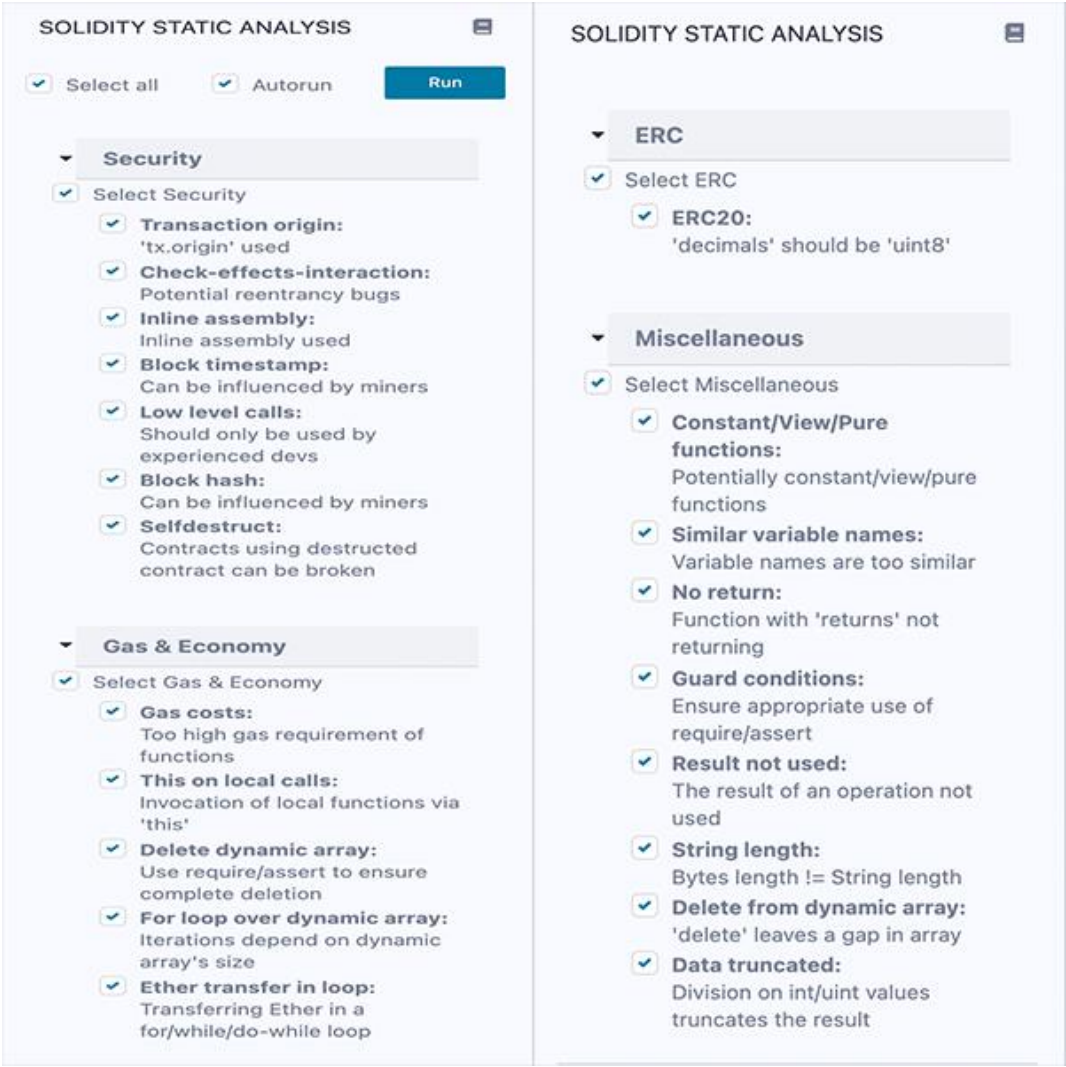
https://sepolia.etherscan.io/solcbuginfo

Remediation

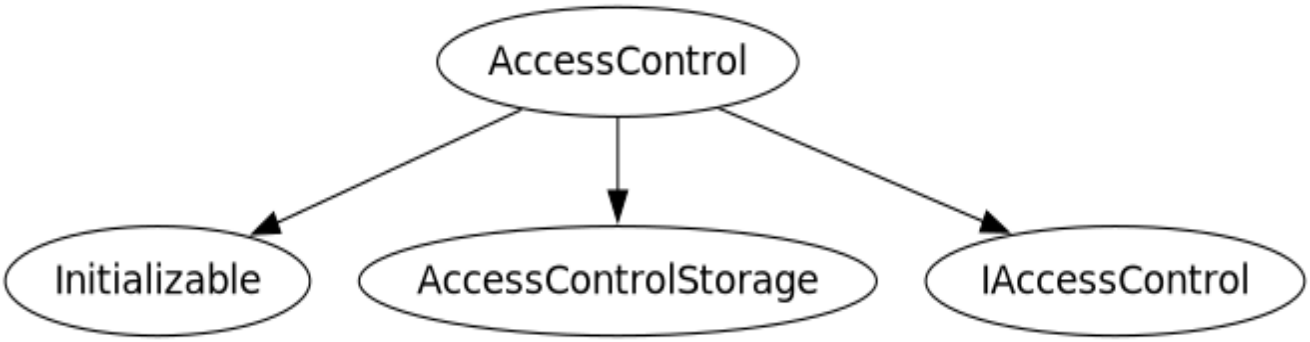
Remove the ^ sign to lock the pragma version.

Automatic Testing

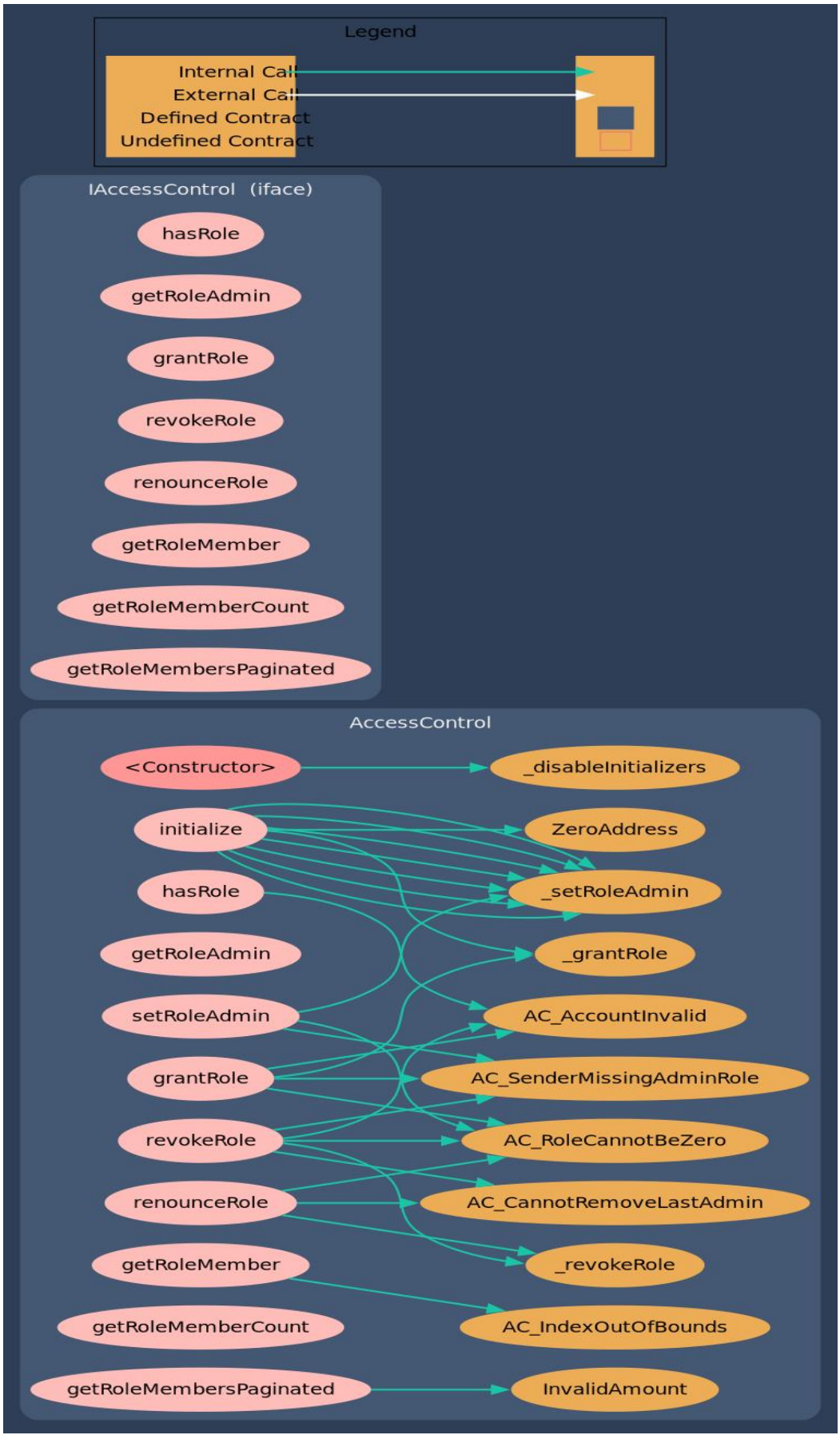
1- SOLIDITY STATIC ANALYSIS



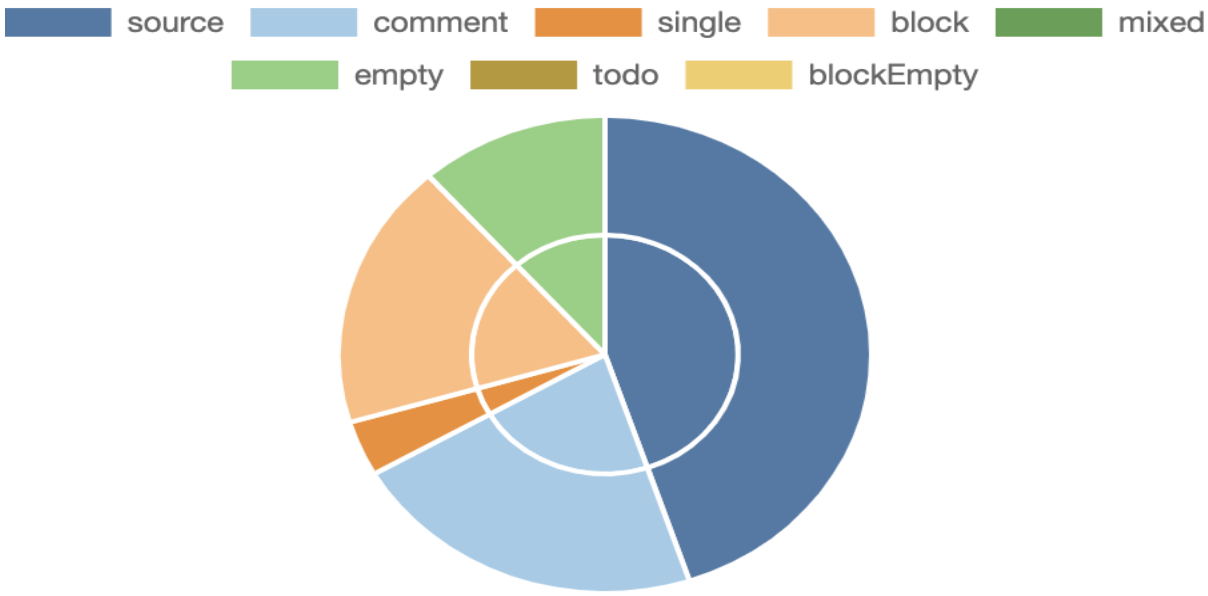
2- Inheritance graph



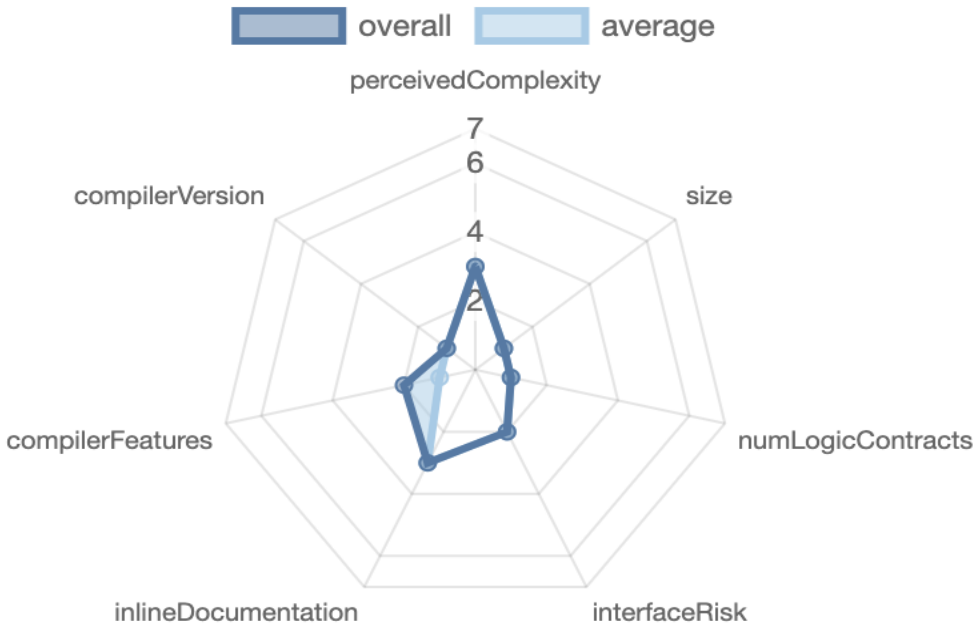
3- Call graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
IAccessControl (iface)
hasRole
getRoleAdmin
grantRole
revokeRole
renounceRole
getRoleMember
getRoleMemberCount
getRoleMembersPaginated
AccessControl
<Constructor>
initialize
hasRole
getRoleAdmin
setRoleAdmin
grantRole
revokeRole
renounceRole
getRoleMember
getRoleMemberCount
getRoleMembersPaginated
_disableInitializers
ZeroAddress
_setRoleAdmin
_grantRole
AC_AccountInvalid
AC_SenderMissingAdminRole
AC_RoleCannotBeZero
AC_CannotRemoveLastAdmin
_revokeRole
AC_IndexOutOfBounds
InvalidAmount

Source lines



Risk level



Source units in scope

Source Units in Scope

Source Units Analyzed: `1`
Source Units in Scope: `1` **(100%)**

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
📝	contracts/access/AccessControl.sol	1	———	251	251	144	70	151	🧱
📝	**Totals**	**1**	———	**251**	**251**	**144**	**70**	**151**	🧱

Legend: [➖]

- **Lines**: total lines of the source unit
- **nLines**: normalized lines of the source unit (e.g. normalizes functions spanning multiple lines)
- **nSLOC**: normalized source lines of code (only source-code lines; no comments, no blank lines)
- **Comment Lines**: lines containing single or block comments
- **Complexity Score**: a custom complexity score derived from code statements that are known to introduce code complexity (branches, loops, calls, external interfaces, ...)

Capabilities

Components

📝Contracts	📚Libraries	🔍Interfaces	💊Abstract
1	0	0	0

Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.

🌐Public	💰Payable
10	0

External	Internal	Private	Pure	View
10	12	0	0	5

StateVariables

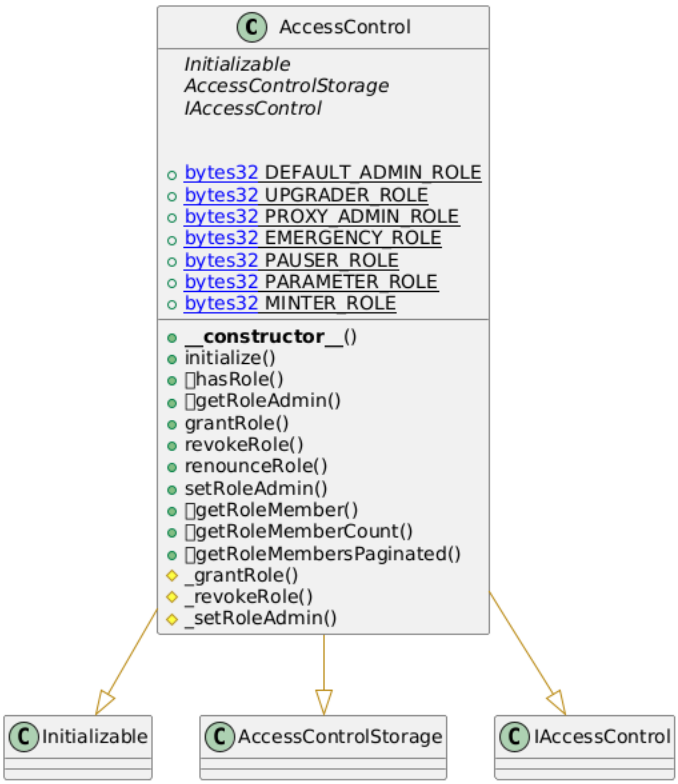
Total	🌐Public
7	7

Capabilities

Solidity Versions observed	🧪 Experimental Features	💰 Can Receive Funds	🖥️ Uses Assembly	💣 Has Destroyable Contracts
`0.8.28`		———	———	———

📩 Transfers ETH	⚡ Low-Level Calls	👥 DelegateCall	🧱 Uses Hash Functions	🪛 ECRecover	🌀 New/Create/Create2
———	———	———	yes	———	———

Unified Modeling Language (UML)



Functions signature

```
| Function Name | Sighash    | Function Signature |
| ------------- | ---------- | ------------------ |
| initialize | c4d66de8 | initialize(address) |
| hasRole | 91d14854 | hasRole(bytes32,address) |
| getRoleAdmin | 248a9ca3 | getRoleAdmin(bytes32) |
| grantRole | 2f2ff15d | grantRole(bytes32,address) |
| revokeRole | d547741f | revokeRole(bytes32,address) |
| renounceRole | 8bb9c5bf | renounceRole(bytes32) |
| setRoleAdmin | 1e4e0091 | setRoleAdmin(bytes32,bytes32) |
| getRoleMember | 9010d07c | getRoleMember(bytes32,uint256) |
| getRoleMemberCount | ca15c873 | getRoleMemberCount(bytes32) |
| getRoleMembersPaginated | 5d0e82bc |
getRoleMembersPaginated(bytes32,uint256,uint256) |
```

Automatic general report

Files Description Table

File Name	SHA-1 Hash
/Users/macbook/Desktop/drt-pREWA/contracts/access/AccessControl.sol	40163fa249f10365c03cf1fa9ddd26e2f6eb1005
/Users/macbook/Desktop/drt-pREWA/contracts/access/storage/AccessControlStorage.sol	2a1f4c3d6956a89011b090a62b15254b1d720d65
/Users/macbook/Desktop/drt-pREWA/contracts/access/interfaces/IAccessControl.sol	540ec54eaade1c05a650af086ebf959654ec6322
/Users/macbook/Desktop/drt-pREWA/contracts/libraries/Errors.sol	0974f6f49e3b655fa93a2792154f1b506ec03c74

Contracts Description Table

Contract	Type	Bases
└	**Function Name**	**Visibility**	**Mutability**	**Modifiers**
AccessControl	Implementation	Initializable, AccessControlStorage, IAccessControl		
└	<Constructor>	Public ❗	🛑	NO❗
└	initialize	External ❗	🛑	initializer
└	hasRole	External ❗		NO❗
└	getRoleAdmin	External ❗		NO❗
└	grantRole	External ❗	🛑	NO❗
└	revokeRole	External ❗	🛑	NO❗
└	renounceRole	External ❗	🛑	NO❗
└	setRoleAdmin	External ❗	🛑	NO❗
└	getRoleMember	External ❗		NO❗
└	getRoleMemberCount	External ❗		NO❗
└	getRoleMembersPaginated	External ❗		NO❗
└	_grantRole	Internal 🔒	🛑	
└	_revokeRole	Internal 🔒	🛑	
└	_setRoleAdmin	Internal 🔒	🛑	
AccessControlStorage	Implementation			
IAccessControl	Interface			
└	hasRole	External ❗		NO❗

└	getRoleAdmin	External ❗		NO❗
└	grantRole	External ❗	🛑	NO❗
└	revokeRole	External ❗	🛑	NO❗
└	renounceRole	External ❗	🛑	NO❗
└	getRoleMember	External ❗		NO❗
└	getRoleMemberCount	External ❗		NO❗
└	getRoleMembersPaginated	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 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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