



SOLIDProof
Bring trust into your projects

Blockchain Security | Smart Contract Audits | KYC

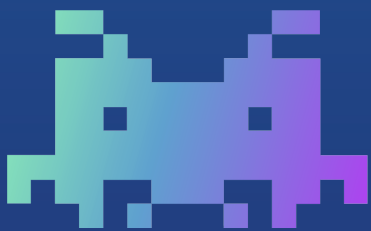
MADE IN GERMANY

BitCrush

Audit

Security Assessment
06. April, 2022

For



BITCRUSH

| | |
|--|----|
| Disclaimer | 3 |
| Description | 5 |
| Project Engagement | 5 |
| Logo | 5 |
| Contract Link | 5 |
| Methodology | 8 |
| Used Code from other Frameworks/Smart Contracts (direct imports) | 9 |
| Tested Contract Files | 10 |
| Source Lines | 11 |
| Risk Level | 11 |
| Capabilities | 12 |
| Inheritance Graph | 14 |
| CallGraph | 15 |
| Scope of Work/Verify Claims | 17 |
| Modifiers and public functions | 19 |
| Source Units in Scope | 22 |
| Critical issues | 23 |
| High issues | 23 |
| Medium issues | 23 |
| Low issues | 23 |
| Informational issues | 23 |
| Audit Comments | 23 |
| SWC Attacks | 24 |

Disclaimer

SolidProof.io reports are not, nor should be considered, an “endorsement” or “disapproval” of any particular project or team. These reports are not, nor should be considered, an indication of the economics or value of any “product” or “asset” created by any team. SolidProof.io do not cover testing or auditing the integration with external contract or services (such as Uniswap, Uniswap, PancakeSwap etc’...)

SolidProof.io Audits do not provide any warranty or guarantee regarding the absolute bug- free nature of the technology analyzed, nor do they provide any indication of the technology proprietors. SolidProof Audits should not be used in any way to make decisions around investment or involvement with any particular project. These reports in no way provide investment advice, nor should be leveraged as investment advice of any sort.

SolidProof.io Reports represent an extensive auditing process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology. Blockchain technology and cryptographic assets present a high level of ongoing risk. SolidProof’s position is that each company and individual are responsible for their own due diligence and continuous security. SolidProof in no way claims any guarantee of security or functionality of the technology we agree to analyze.

| Version | Date | Description |
|---------|----------------|--|
| 1.0 | 04. March 2022 | <ul style="list-style-type: none">• Layout project• Automated- /Manual-Security Testing• Summary |
| 1.1 | 07. March 2022 | Reaudit |
| 1.2 | 09. March 2022 | Reaudit |
| 1.3 | 06. April 2022 | Reaudit |

Network

Binance Smart Chain (BEP20)

Website

<https://www.bitcrush.com/>

Telegram

<https://t.me/Bcarcadechat>

Twitter

<https://twitter.com/bitcrusharcade>



Description

Bitcrush Arcade is a gaming platform aimed to further integrate the world of Defi and Gaming. It is our belief as technologies progress, the line between iGaming and decentralized finance will continue to blur.

Project Engagement

During the 3rd of March 2022, **Bitcrush Team** engaged Solidproof.io to audit smart contracts that they created. The engagement was technical in nature and focused on identifying security flaws in the design and implementation of the contracts. They provided Solidproof.io with access to their code repository and whitepaper.

Logo



Contract Link

v1.0

- Github
 - https://github.com/Bitcrush-Arcade/crush_contracts/tree/galacticFarms/contracts
 - Commit: 65a5bf7247e78e52dd0a9afab38a76d492fa15f8

v1.1

- Github
 - https://github.com/Bitcrush-Arcade/crush_contracts/tree/galacticFarms/contracts
 - Commit: b40d89005b82b0ba4e9726fe7b6b920ce07219ae

v1.2

- Github
 - https://github.com/Bitcrush-Arcade/crush_contracts/tree/galacticFarms/contracts
 - Commit: 2f15f7b132d275e28084f7a3fc6848f6176c427f

v1.3

- Github
 - FeeDistributorV3

- https://github.com/Bitcrush-Arcade/crush_contracts/blob/pythonMigration/contracts/FeeDistributorV3.sol
- Commit: 1f880802798b9929d520ca6c1b6820b29fb69082
- InvaderPool
 - https://github.com/Bitcrush-Arcade/crush_contracts/blob/pythonMigration/contracts/InvaderPool.sol
 - Commit: 7756c367dflee8eaaed60d6e8ee2d3971899703f



Vulnerability & Risk Level

Risk represents the probability that a certain source-threat will exploit vulnerability, and the impact of that event on the organization or system. Risk Level is computed based on CVSS version 3.0.

| Level | Value | Vulnerability | Risk (Required Action) |
|----------------------|---------|---|---|
| Critical | 9 - 10 | A vulnerability that can disrupt the contract functioning in a number of scenarios, or creates a risk that the contract may be broken. | Immediate action to reduce risk level. |
| High | 7 – 8.9 | A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way. | Implementation of corrective actions as soon as possible. |
| Medium | 4 – 6.9 | A vulnerability that could affect the desired outcome of executing the contract in a specific scenario. | Implementation of corrective actions in a certain period. |
| Low | 2 – 3.9 | A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective. | Implementation of certain corrective actions or accepting the risk. |
| Informational | 0 – 1.9 | A vulnerability that have informational character but is not effecting any of the code. | An observation that does not determine a level of risk |

Auditing Strategy and Techniques Applied

Throughout the review process, care was taken to evaluate the repository for security-related issues, code quality, and adherence to specification and best practices. To do so, reviewed line-by-line by our team of expert pentesters and smart contract developers, documenting any issues as there were discovered.

Methodology

The auditing process follows a routine series of steps:

1. Code review that includes the following:
 - i) Review of the specifications, sources, and instructions provided to SolidProof to make sure we understand the size, scope, and functionality of the smart contract.
 - ii) Manual review of code, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
 - iii) Comparison to specification, which is the process of checking whether the code does what the specifications, sources, and instructions provided to SolidProof describe.
2. Testing and automated analysis that includes the following:
 - i) Test coverage analysis, which is the process of determining whether the test cases are actually covering the code and how much code is exercised when we run those test cases.
 - ii) Symbolic execution, which is analysing a program to determine what inputs causes each part of a program to execute.
3. Best practices review, which is a review of the smart contracts to improve efficiency, effectiveness, clarify, maintainability, security, and control based on the established industry and academic practices, recommendations, and research.
4. Specific, itemized, actionable recommendations to help you take steps to secure your smart contracts.

Used Code from other Frameworks/Smart Contracts (direct imports)

Imported packages:

| Dependency / Import Path | Count |
|--|-------|
| @openzeppelin/contracts/access/Ownable.sol | 3 |
| @openzeppelin/contracts/security/ReentrancyGuard.sol | 1 |
| @openzeppelin/contracts/token/ERC20/IERC20.sol | 2 |
| @openzeppelin/contracts/token/ERC20/extensions/ERC20Burnable.sol | 1 |
| @openzeppelin/contracts/token/ERC20/utils/SafeERC20.sol | 3 |
| @openzeppelin/contracts/utils/math/SafeMath.sol | 1 |
| @openzeppelin/contracts/access/Ownable.sol | 2 |
| @openzeppelin/contracts/security/ReentrancyGuard.sol | 1 |
| @openzeppelin/contracts/token/ERC20/IERC20.sol | 1 |

Tested Contract Files

This audit covered the following files listed below with a SHA-1 Hash.

A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

| File Name | SHA-1 Hash |
|-------------------------------|--|
| contracts/GalacticChef.sol | a649b64a30c2941d323ef92e1e8564c276774fc9 |
| contracts/IStaking.sol | 3b7ffdc51969a81503261458b1ec30418f707471 |
| contracts/IFeeDistributor.sol | c7c8197683564b2df2302f66ab39ffa211c30001 |
| contracts/FeeDistributor.sol | 69f9c29f339ecb30a270a9afc325ad6843c81abc |
| contracts/niceStaking.sol | 5bffde5e01ca9510e8eb3256ad914ab48eff872e |

v1.2

| File Name | SHA-1 Hash |
|--------------------------------|--|
| contracts/FeeDistributorV3.sol | 4f48be169922c7aae0dfc260517d85f5ddd45f8f |
| contracts/InvaderPool.sol | 93a94db99e663fd264d5e0d433965081fca5ef17 |

Metrics

Source Lines

v1.0

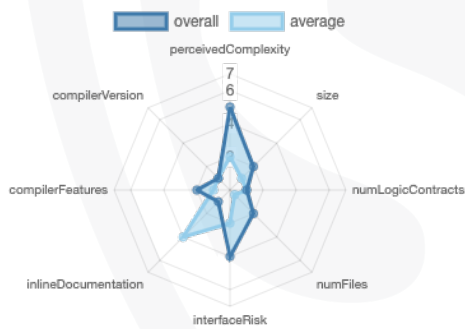


v1.2

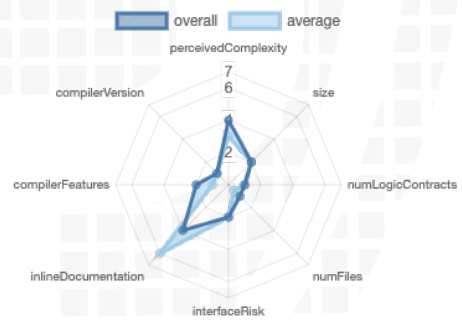


Risk Level

v1.0



v1.2



Capabilities

Components

| Version | Contracts | Libraries | Interfaces | Abstract |
|---------|-----------|-----------|------------|----------|
| 1.0 | 3 | 0 | 2 | 0 |
| 1.2 | 2 | 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.

| Version | Public | Payable |
|---------|--------|---------|
| 1.0 | 36 | 0 |
| 1.2 | 18 | 2 |

| Version | External | Internal | Private | Pure | View |
|---------|----------|----------|---------|------|------|
| 1.0 | 23 | 51 | 0 | 4 | 4 |
| 1.2 | 17 | 31 | 0 | 1 | 4 |

State Variables

| Version | Total | Public |
|---------|-------|--------|
| 1.0 | 47 | 43 |
| 1.2 | 28 | 28 |

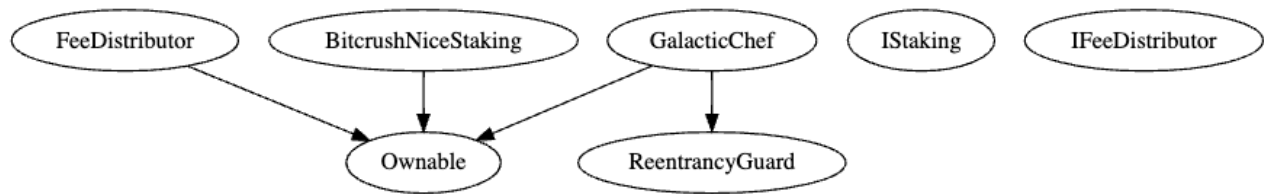
Capabilities

| Version | Solidity Versions observed | Experimental Features | Can Receive Funds | Uses Assembly | Has Destroyable Contracts |
|---------|----------------------------|-----------------------|-------------------|---------------|---------------------------|
| 1.0 | 0.8.12 ^0.8.0 | | | | |
| 1.2 | 0.8.12 | | yes | | |

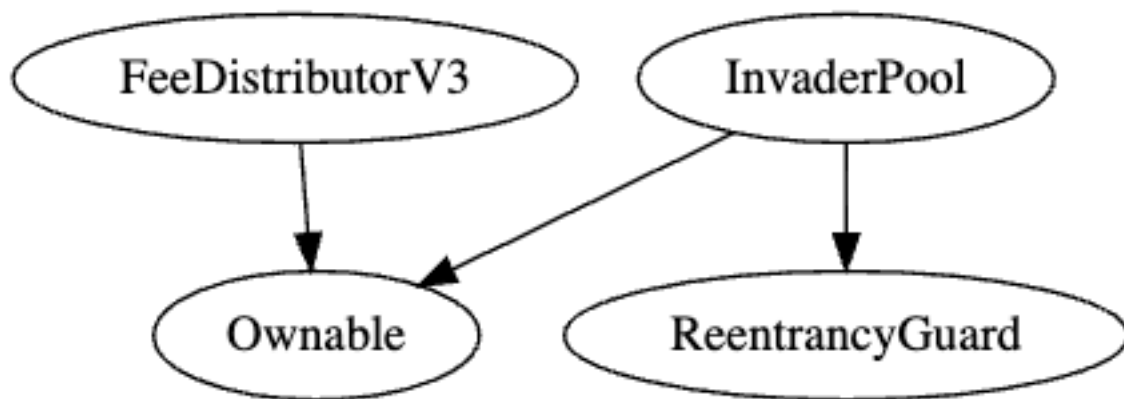
| Version | Transfers ETH | Low-Level Calls | DelegateCall | Uses Hash Functions | EC Recover | New/Create/Create2 |
|---------|---------------|-----------------|--------------|---------------------|------------|--------------------|
| 1.0 | yes | | | | | |

Inheritance Graph

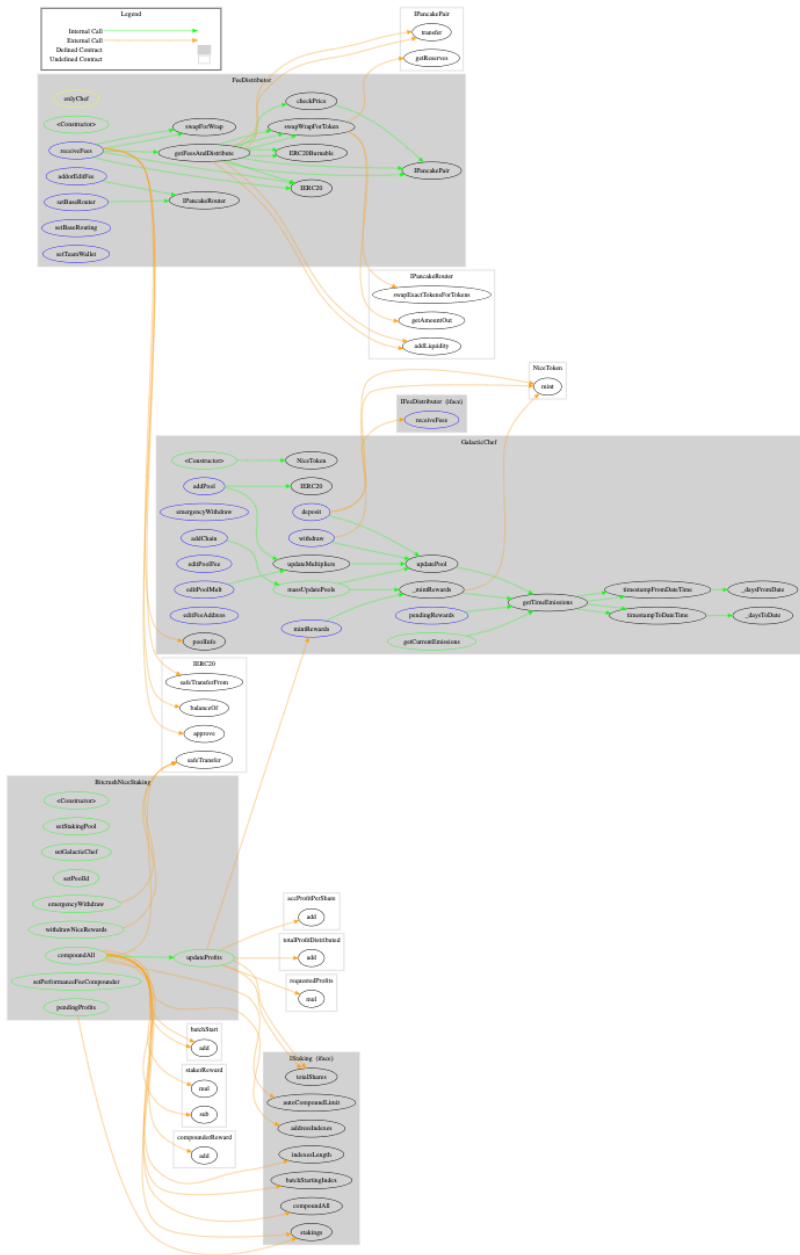
v1.0



v1.2



CallGraph v1.0





Scope of Work/Verify Claims

The above token Team provided us with the files that needs to be tested (Github, Bscscan, Etherscan, files, etc.). The scope of the audit is the main contract (usual the same name as team appended with .sol).

We will verify the following claims:

1. Overall checkup (Smart Contract Security)



Overall checkup (Smart Contract Security)

| Tested | Verified |
|--------|----------|
| ✓ | ✓ |

Legend

| Attribute | Symbol |
|--------------------------|--------|
| Verified / Checked | ✓ |
| Partly Verified | ⚠ |
| Unverified / Not checked | ✗ |
| Not available | — |

Modifiers and public functions

v1.0

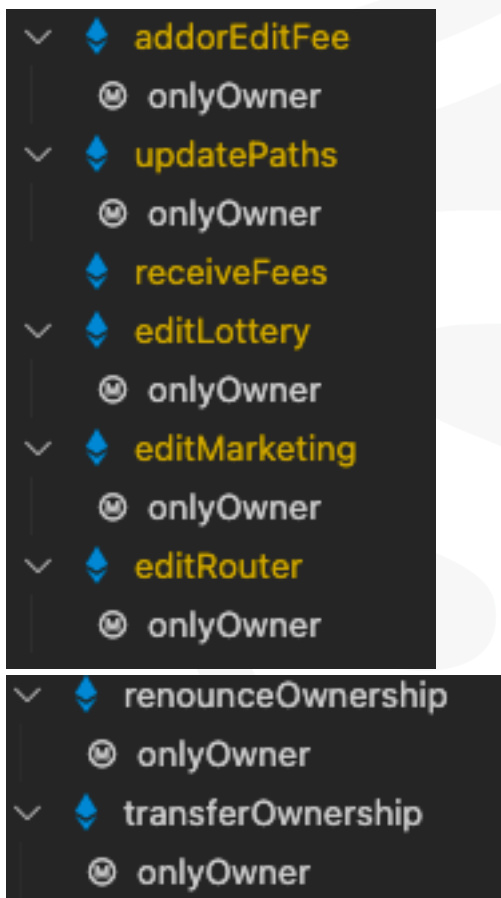
| | | |
|--|---|---|
| <div><div>✓</div><div>◆ addPool</div><div>Ⓜ onlyOwner</div><div>◆ updatePool</div><div>◆ massUpdatePools</div><div>✓</div><div>◆ mintRewards</div><div>Ⓜ nonReentrant</div><div>✓</div><div>◆ deposit</div><div>Ⓜ nonReentrant</div><div>✓</div><div>◆ withdraw</div><div>Ⓜ nonReentrant</div><div>✓</div><div>◆ emergencyWithdraw</div><div>Ⓜ nonReentrant</div><div>✓</div><div>◆ editPoolMult</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ editPoolFee</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ addChain</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ editFeeAddress</div><div>Ⓜ onlyOwner</div></div> | <div><div>✓</div><div>◆ renounceOwnership</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ transferOwnership</div><div>Ⓜ onlyOwner</div></div> | <div><div>✓</div><div>◆ setStakingPool</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ setGalacticChef</div><div>Ⓜ onlyOwner</div><div>✓</div><div>◆ setPoolId</div><div>Ⓜ onlyOwner</div><div>◆ updateProfits</div><div>◆ pendingProfits</div><div>◆ compoundAll</div><div>◆ withdrawNiceRewards</div><div>✓</div><div>◆ setPerformanceFeeCompounder</div><div>Ⓜ onlyOwner</div><div>◆ emergencyWithdraw</div></div> |
|--|---|---|

Comments

- Deployer can set following state variables without any limitations
 - niceStaking
 - poolId
- Deployer can set following addresses
 - FeeDistribution
 - tokenRouter
 - niceLiquidity
 - nicePath
 - crushLiquidity
 - crushPath
 - teamWallet

- niceStaking
 - stakingPool
 - galacticChef
- GalacticChef
 - Everybody can call updatePool function
 - OnlyOwner can increment chains state variable by calling addChain function L355

v1.2



Comments

- Deployer can set following state variables without any limitations
 - InvaderPool
 - poolLimit
 - rewardPerBlock
 - As long as pool not started
- Deployer can set following addresses
 - FeeDistribution
 - tokenPath










- token0Path
- token1Path
- routerCrush
- routerNice
- marketingWallet
- lottery
- InvaderPool
 - feeAddress

- Owner can create feeData







Please check if an OnlyOwner or similar restrictive modifier has been forgotten.

Source Units in Scope

v1.0

| Type | File | Logic Contracts | Interfaces | Lines | nLines | nSLOC | Comment Lines | Complex. Score | Capabilities |
|---|-------------------------------|-----------------|------------|------------|------------|------------|---------------|----------------|---|
|  | contracts/GalacticChef.sol | 1 | ———— | 449 | 435 | 287 | 124 | 185 |  |
|  | contracts/IStaking.sol | ———— | 1 | 29 | 5 | 3 | 1 | 15 | ———— |
|  | contracts/IFeeDistributor.sol | ———— | 1 | 6 | 5 | 3 | 1 | 3 | ———— |
|  | contracts/FeeDistributor.sol | 1 | ———— | 322 | 295 | 239 | 48 | 127 |  |
|  | contracts/niceStaking.sol | 1 | ———— | 177 | 177 | 126 | 31 | 90 | ———— |
|  | Totals | 3 | 2 | 983 | 917 | 658 | 205 | 420 |  |

v1.2

| Type | File | Logic Contracts | Interfaces | Lines | nLines | nSLOC | Comment Lines | Complex. Score | Capabilities |
|--|--------------------------------|-----------------|------------|------------|------------|------------|---------------|----------------|--|
|  | contracts/FeeDistributorV3.sol | 1 | ———— | 594 | 529 | 422 | 104 | 237 |  |
|  | contracts/InvaderPool.sol | 1 | ———— | 241 | 234 | 179 | 27 | 98 |  |
|  | Totals | 2 | ———— | 835 | 763 | 601 | 131 | 335 |  |

Legend

| Attribute | Description |
|------------------|---|
| 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, ...) |

Audit Results

AUDIT PASSED

Critical issues

No critical issues

High issues

No high issues

Medium issues

No medium issues

Low issues

No low issues

Informational issues

| Issue | File | Type | Line | Description |
|-------|------------------|----------------|------|---|
| #1 | FeeDistributorV3 | Missing return | L180 | Else condition returns value but If condition doesn't |

Audit Comments

01. April 2022:

- [Read whole report for more information](#)

SWC Attacks

| ID | Title | Relationships | Status |
|---------------------------|---|--|--------|
| SW C-1 36 | Unencrypted Private Data On-Chain | CWE-767: Access to Critical Private Variable via Public Method | PASSED |
| SW C-1 35 | Code With No Effects | CWE-1164: Irrelevant Code | PASSED |
| SW C-1 34 | Message call with hardcoded gas amount | CWE-655: Improper Initialization | PASSED |
| SW C-1 33 | Hash Collisions With Multiple Variable Length Arguments | CWE-294: Authentication Bypass by Capture-replay | PASSED |
| SW C-1 32 | Unexpected Ether balance | CWE-667: Improper Locking | PASSED |
| SW C-1 31 | Presence of unused variables | CWE-1164: Irrelevant Code | PASSED |
| SW C-1 30 | Right-To-Left-Override control character (U+202E) | CWE-451: User Interface (UI) Misrepresentation of Critical Information | PASSED |
| SW C-1 29 | Typographical Error | CWE-480: Use of Incorrect Operator | PASSED |
| SW C-1 28 | DoS With Block Gas Limit | CWE-400: Uncontrolled Resource Consumption | PASSED |

| | | | |
|---------------------------|---|---|---------------|
| SW C-1 27 | Arbitrary Jump with Function Type Variable | CWE-695: Use of Low-Level Functionality | PASSED |
| SW C-1 25 | Incorrect Inheritance Order | CWE-696: Incorrect Behavior Order | PASSED |
| SW C-1 24 | Write to Arbitrary Storage Location | CWE-123: Write-what-where Condition | PASSED |
| SW C-1 23 | Requirement Violation | CWE-573: Improper Following of Specification by Caller | PASSED |
| SW C-1 22 | Lack of Proper Signature Verification | CWE-345: Insufficient Verification of Data Authenticity | PASSED |
| SW C-1 21 | Missing Protection against Signature Replay Attacks | CWE-347: Improper Verification of Cryptographic Signature | PASSED |
| SW C-1 20 | Weak Sources of Randomness from Chain Attributes | CWE-330: Use of Insufficiently Random Values | PASSED |
| SW C-11 9 | Shadowing State Variables | CWE-710: Improper Adherence to Coding Standards | PASSED |
| SW C-11 8 | Incorrect Constructor Name | CWE-665: Improper Initialization | PASSED |
| SW C-11 7 | Signature Malleability | CWE-347: Improper Verification of Cryptographic Signature | PASSED |

| | | | |
|---------------------------|--------------------------------------|--|---------------|
| SW C-11 6 | Timestamp Dependence | CWE-829: Inclusion of Functionality from Untrusted Control Sphere | PASSED |
| SW C-11 5 | Authorization through tx.origin | CWE-477: Use of Obsolete Function | PASSED |
| SW C-11 4 | Transaction Order Dependence | CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition') | PASSED |
| SW C-11 3 | DoS with Failed Call | CWE-703: Improper Check or Handling of Exceptional Conditions | PASSED |
| SW C-11 2 | Delegatecall to Untrusted Callee | CWE-829: Inclusion of Functionality from Untrusted Control Sphere | PASSED |
| SW C-11 1 | Use of Deprecated Solidity Functions | CWE-477: Use of Obsolete Function | PASSED |
| SW C-11 0 | Assert Violation | CWE-670: Always-Incorrect Control Flow Implementation | PASSED |
| SW C-1 09 | Uninitialized Storage Pointer | CWE-824: Access of Uninitialized Pointer | PASSED |
| SW C-1 08 | State Variable Default Visibility | CWE-710: Improper Adherence to Coding Standards | PASSED |
| SW C-1 07 | Reentrancy | CWE-841: Improper Enforcement of Behavioral Workflow | PASSED |
| SW C-1 06 | Unprotected SELFDESTRUCT Instruction | CWE-284: Improper Access Control | PASSED |

| | | | |
|---|--------------------------------------|--|---------------|
| SW C-1 05 | Unprotected Ether Withdrawal | CWE-284: Improper Access Control | PASSED |
| SW C-1 04 | Unchecked Call Return Value | CWE-252: Unchecked Return Value | PASSED |
| SW C-1 03 | Floating Pragma | CWE-664: Improper Control of a Resource Through its Lifetime | PASSED |
| SW C-1 02 | Outdated Compiler Version | CWE-937: Using Components with Known Vulnerabilities | PASSED |
| SW C-1 01 | Integer Overflow and Underflow | CWE-682: Incorrect Calculation | PASSED |
| SW C-1 00 | Function Default Visibility | CWE-710: Improper Adherence to Coding Standards | PASSED |

The logo features the words "Solid Proofed" in a white, elegant script font. The word "Solid" is positioned above "Proofed". Behind the text is a faint, stylized shield emblem with a grid-like pattern, rendered in a darker shade of blue. The entire composition is set against a solid blue background.

Solid
Proofed

Blockchain Security | Smart Contract Audits | KYC

A small horizontal bar representing the German flag, with black, red, and gold stripes.

MADE IN GERMANY