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**Blockchain Security | Smart Contract Audits | KYC**

MADE IN GERMANY

# Pixul Audit

**Security Assessment**  
**04. February, 2022**

**For**



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Version	Date	Description
1.0	04. February 2022	<ul style="list-style-type: none"><li>• Layout project</li><li>• Automated- /Manual-Security Testing</li><li>• Summary</li></ul>

## **Network**

Binance Smart Chain (BEP20)

## **Website**

<https://www.pixul.io/>

## **Telegram**

<https://t.me/officialpixul>

## **Twitter**

[https://twitter.com/pixul\\_](https://twitter.com/pixul_)

## **Github**

<https://github.com/project-pixul>

## **Reddit**

<https://www.reddit.com/r/officialpixul/>

## **Discord**

<https://discord.gg/mXYG9EtqEq>

## Description

At its current stage, cryptocurrency is extremely complex for the average individual to grasp. Pixul's mission is to develop ease-of-use multi-chain platforms & applications to introduce crypto into real-world use-cases

## Project Engagement

During the 3rd of February 2022, **Pixul 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/project-pixul/Pixul-Ecosystem/blob/main/PixulToken.sol>
  - Commit: 6908770f948bed2b2b0f060b228c6ac5a7fc32af

# 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)
<b>Critical</b>	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.
<b>High</b>	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.
<b>Medium</b>	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.
<b>Low</b>	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.
<b>Informational</b>	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:

```
ERC20Interface  
Context  
ReentrancyGuard  
ApproveAndCallFallBack  
Owned
```





# Tested Contract Files

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

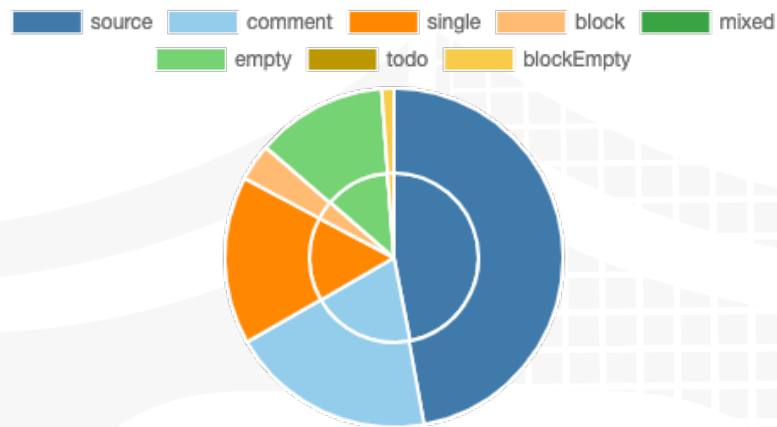
*A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.*

## v1.0

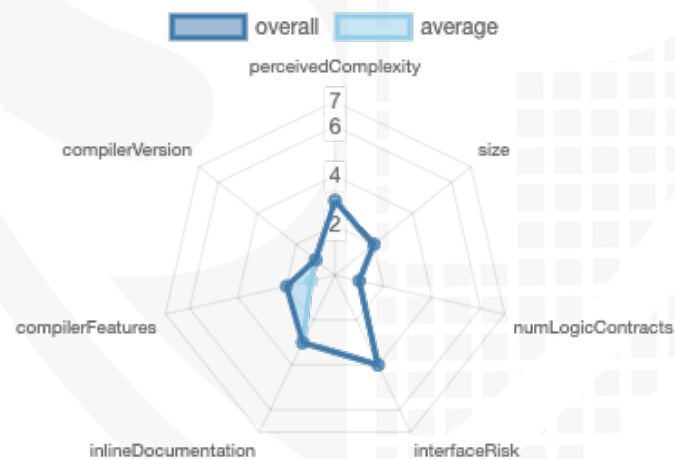
File Name	SHA-1 Hash
contracts/pixultoken.sol	b519e5ddf8f124390bb429c68ebc426b289c6883

# Metrics

## Source Lines v1.0



## Risk Level v1.0



## Capabilities

### Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	2	0	2	2

### 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	37	0

Version	External	Internal	Private	Pure	View
1.0	9	37	0	0	11

### State Variables

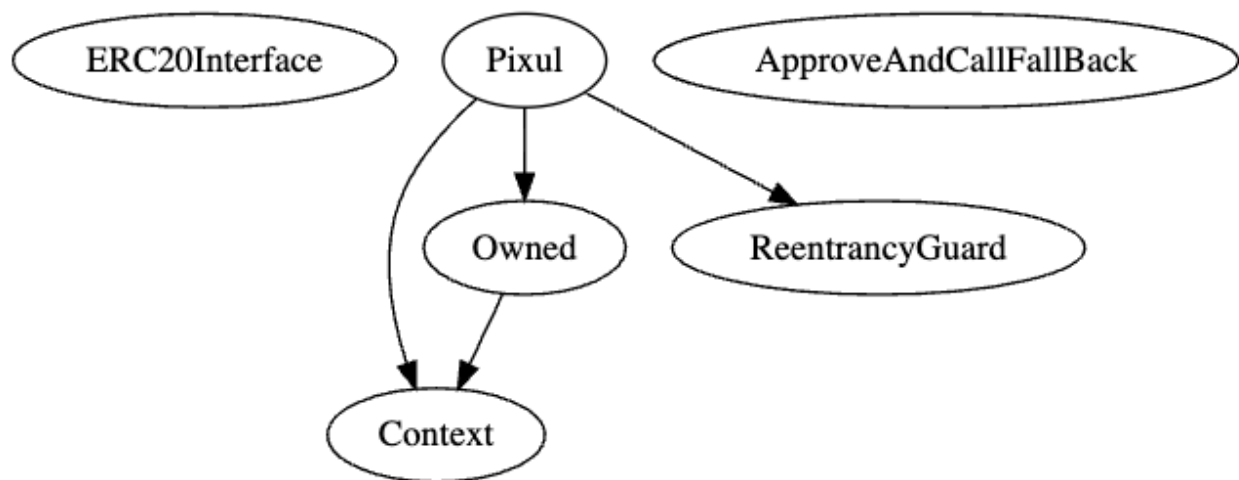
Version	Total	Public
1.0	16	11

### Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	^0.8.7				

## Inheritance Graph

v1.0



# 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. Correct implementation of Token standard
2. Deployer cannot mint any new tokens
3. Deployer cannot burn or lock user funds
4. Deployer cannot pause the contract
5. Overall checkup (Smart Contract Security)

### Correct implementation of Token standard

Function	Description	Exist	Tested	Verified
TotalSupply	provides information about the total token supply	✓	✓	✓
BalanceOf	provides account balance of the owner's account	✓	✓	✓
Transfer	executes transfers of a specified number of tokens to a specified address	✓	✓	✓
TransferFrom	executes transfers of a specified number of tokens from a specified address	✓	✓	✓
Approve	allow a spender to withdraw a set number of tokens from a specified account	✓	✓	✓
Allowance	returns a set number of tokens from a spender to the owner	✓	✓	✓

## Write functions of contract v1.0



acceptOwners...
allowMinter
allowSwapper
approve
approveAndCall
burnFrom
cancelSwaps
cancelSwapsOf
lockForSwap
lockForSwapTo
mintTo
revokeMinter
revokeSwapper
setName
swapConfirmed
transfer
setDecimals
setTicker
transferAndCall
transferAnyER...
transferFrom
transferOwner...

## Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	✓	✓	✗
Max / Total Supply	750.000.000		

Comments:

**v1.0**

- OnlyMinter can mint new tokens





## Deployer cannot burn or lock user funds

Name	Exist	Tested	Status
Deployer cannot lock	✓	✓	✓
Deployer cannot burn	✓	✓	✗

Comments:

**v1.0**

- onlyOwner can burn
  - onlyOwner can burn from address without any permissions

Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	-	-	-



## Overall checkup (Smart Contract Security)

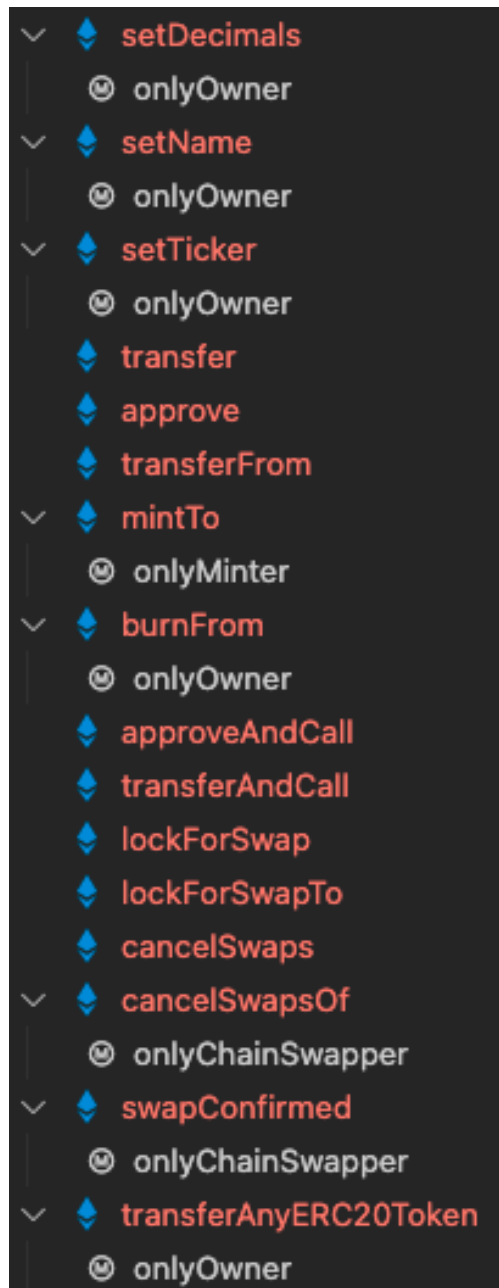
Tested	Verified
✓	✓

### Legend

Attribute	Symbol
Verified / Checked	✓
Partly Verified	🚩
Unverified / Not checked	✗
Not available	—

# Modifiers and public functions

v1.0

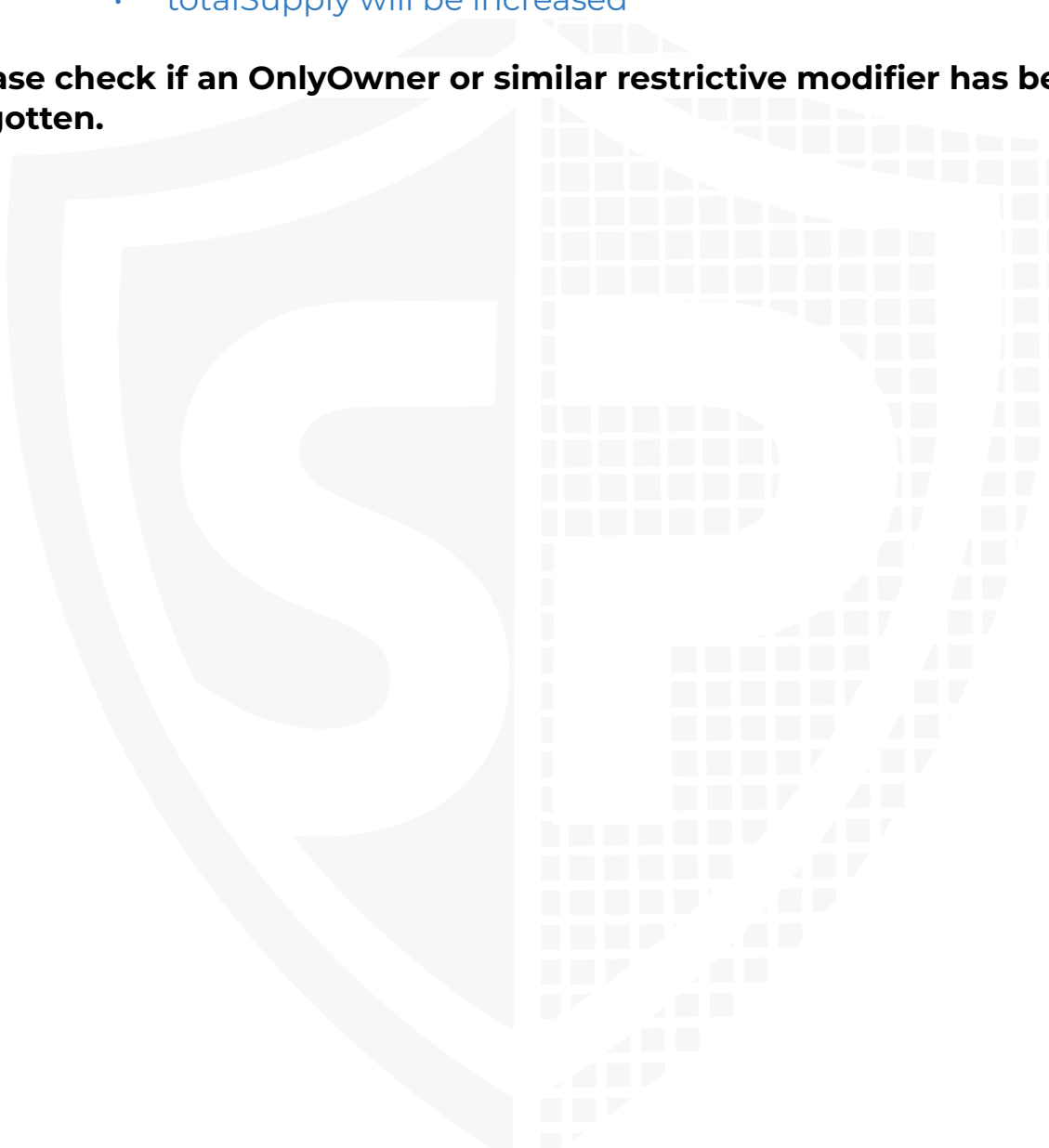


## Comments

- Deployer can set following state variables without any limitations
  - decimals
  - name
  - symbol
- Deployer can enable/disable following state variables
  - minterAccesses
  - chainSwappers
- Deployer can





- Mint to everyone without limitations
- Burn from everyone without permissions
- Anyone can
  - lock for swap/lock for swap to
  - Cancel swap
- onlyChainSwapper can
  - Cancel swaps of
  - Confirm swap
    - totalSupply will be increased

**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/pixultoken.sol	4	2	399	383	231	100	185	
	Totals	4	2	399	383	231	100	185	

### 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

Issue	File	Type	Line	Description
#1	Main	Owner can burn from any addresses	307-312	<p>Owner don't need any permission to burn tokens from any specific address.</p> <p>Make sure to implement any permissions to burn tokens from someone other that nobody can burn any tokens from other address without any permission</p>

### Low issues

Issue	File	Type	Line	Description
#1	Main	Contract doesn't import npm packages from source (like OpenZeppelin etc.)	-	We recommend to import all packages from npm directly without flatten the contract. Functions could be modified or can be susceptible to vulnerabilities
#2	Main	A floating pragma is set	1	The current pragma Solidity directive is „^0.8.7“.

#3	Main	Missing Zero Address Validation (missing-zero-check)	102	Check that the address is not zero
#4	Main	Changing name, symbol and decimals after deploying	See description	<p>We don't recommend to change name, symbol and decimals while the contract is deployed because it is not comply at all with the ERC20 specifications</p> <p>Please remove following functions:</p> <ul style="list-style-type: none"> <li>- setDecimals L199</li> <li>- setName L203</li> <li>- setTicker (Wrong name to set symbol) L207</li> </ul> <p>After the function has been removed, make sure to set the visibility of following state variables to constant</p> <ul style="list-style-type: none"> <li>- symbol L169</li> <li>- Name L170</li> <li>- Decimals L171</li> </ul>
#5	Main	Tautology or contradiction	283	<p>Fix the incorrect comparison by changing the value type or the comparison</p> <p>Change:</p> <pre>require(tokens &gt;= 0, "Please use an amount greater than zero");</pre> <p>To</p> <pre>require(tokens &gt; 0, "Please use an amount greater than zero");</pre>
#6	Main	Wrong comment	265, 235	<p>0 value transfers are not allowed</p> <p>See L283</p>



#7	Main	Require error message	88, 93, 98, 106, 301, 308, 338, 339, 358, 366, 374	The require error message is missing. Provide an error message to the statement
#8	Main	Modify require statement	308	<p>The require statement checks whether the amount is higher than 0 or the amount is lower than the balance of address. This will always be true as long as the amount to burn is lower than the balance of the address because 0 is also zero.</p> <p>We recommend to use following require statement</p> <pre>require(0 &lt; _amount &amp;&amp; _amount &lt;= balances[_guy]);</pre>

## Informational issues

Issue	File	Type	Line	Description
#1	Main	State variables that could be declared constant (constable-states)	176	Add the `constant` attributes to state variables that never change
#2	Main	Remove unused contract	139-162, 48-56	<p>Remove unused contracts</p> <p>Make sure to remove every inheritance of these contracts</p> <p>L70, L168,</p>
#3	Main	Unused state variables	174, 176	Remove unused state variables
#4	Main	Total supply function	215	<p>Remove useless subtraction</p> <p>- balances[address(0)]</p>

#5	Main	"Balance of" function	222-229	<p>You don't have to check for zero address because the zero address will never buy tokens from the contract</p> <p>If someone wants to see the balance of zero address it will be 0</p>
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## Audit Comments

We recommend you to use the special form of comments (NatSpec Format, Follow link for more information <https://docs.soliditylang.org/en/v0.5.10/natspec-format.html>) for your contracts to provide rich documentation for functions, return variables and more. This helps investors to make clear what that variables, functions etc. do.

### 04. February 2022:

- Read whole report for more information

## SWC Attacks

ID	Title	Relationships	Status
<a href="#">SW C-1 36</a>	Unencrypted Private Data On-Chain	<a href="#">CWE-767: Access to Critical Private Variable via Public Method</a>	PASSED
<a href="#">SW C-1 35</a>	Code With No Effects	<a href="#">CWE-1164: Irrelevant Code</a>	NOT PASSED
<a href="#">SW C-1 34</a>	Message call with hardcoded gas amount	<a href="#">CWE-655: Improper Initialization</a>	PASSED
<a href="#">SW C-1 33</a>	Hash Collisions With Multiple Variable Length Arguments	<a href="#">CWE-294: Authentication Bypass by Capture-replay</a>	PASSED
<a href="#">SW C-1 32</a>	Unexpected Ether balance	<a href="#">CWE-667: Improper Locking</a>	PASSED
<a href="#">SW C-1 31</a>	Presence of unused variables	<a href="#">CWE-1164: Irrelevant Code</a>	NOT PASSED
<a href="#">SW C-1 30</a>	Right-To-Left-Override control character (U+202E)	<a href="#">CWE-451: User Interface (UI) Misrepresentation of Critical Information</a>	PASSED
<a href="#">SW C-1 29</a>	Typographical Error	<a href="#">CWE-480: Use of Incorrect Operator</a>	PASSED
<a href="#">SW C-1 28</a>	DoS With Block Gas Limit	<a href="#">CWE-400: Uncontrolled Resource Consumption</a>	PASSED

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

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

<a href="#">SW C-1 05</a>	Unprotected Ether Withdrawal	<a href="#">CWE-284: Improper Access Control</a>	<b>PASSED</b>
<a href="#">SW C-1 04</a>	Unchecked Call Return Value	<a href="#">CWE-252: Unchecked Return Value</a>	<b>PASSED</b>
<a href="#">SW C-1 03</a>	Floating Pragma	<a href="#">CWE-664: Improper Control of a Resource Through its Lifetime</a>	<b>NOT PASSED</b>
<a href="#">SW C-1 02</a>	Outdated Compiler Version	<a href="#">CWE-937: Using Components with Known Vulnerabilities</a>	<b>PASSED</b>
<a href="#">SW C-1 01</a>	Integer Overflow and Underflow	<a href="#">CWE-682: Incorrect Calculation</a>	<b>PASSED</b>
<a href="#">SW C-1 00</a>	Function Default Visibility	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	<b>PASSED</b>

The logo features the words "SolidProof" in a white, handwritten-style script. The "P" is particularly large and stylized, with a long horizontal stroke that extends to the left. The background is a solid blue color with a faint, larger-scale grid pattern. Behind the text, there is a faint, semi-transparent shield-like shape that also contains a grid pattern.

SolidProof

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

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