SOLIDProof

Bring trust into your projects

Blockchain Security | Smart Contract Audits | KYC

MADE IN GERMANY

Audit

Security Assessment

14. August, 2021

For

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Version	Date	Description
1.0	14. August 2021	• Layout project • Automated- /Manual-Security Testing • Summary

Network
Binance Smart Chain (BEP20)

Website
https://www.axieninja.app/

Telegram
https://t.me/Axieninjaofficial

Twitter
https://twitter.com/AxieNinja?s=08

Description

AXIE NINJA is a blockchain-based tournament platform that allows players of all skill levels, as well as developers and organisers, to profit from their efforts. AXIE NINJA is a platform that allows all gamers to profit from their abilities. Their goal is to create a fair and trustworthy "play-to-earn" platform where players may play their favourite games, challenge an opponent (or allow AXIE NINJA locate one for them), and bet on their own triumph.

AXIE NINJA is a groundbreaking web-based BSC roleplaying game created by the outstanding Riveted Games team and launched on the Binance Smart Chain. After fighting foes and participating in raids, players are rewarded with SKILL tokens, which are the game's primary mechanics. To boost their overall power, they can hire more characters, make unique weapons, and reforge those weapons. On an open market, players may also exchange their characters and weapons. They can also put their SKILL earnings on the line in exchange for more SKILL.

Project Engagement

During the 10th of August 2021, **Axie Ninja 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. **Axie Ninja Team** provided Solidproof.io with access to their code repository and whitepaper.

Logo

Contract Link

https://bscscan.com/address/0x3a05e86c25366031d92e013cac77ff6c261cb09b#code

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 aspossible.
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:

- OpenZeppelin
  - Address
  - Ownable
  - SafeMath
- Uniswap
  - UniswapV2Factory
  - UniswapV2Pair
  - UniswapV2Router01
  - UniswapV2Router02

Tested Contract Files

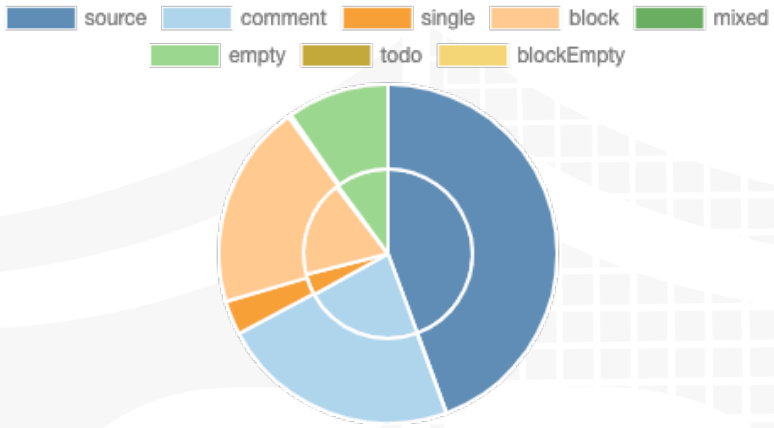
This audit covered the following files listed below with a SHA-1 Hash.

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.

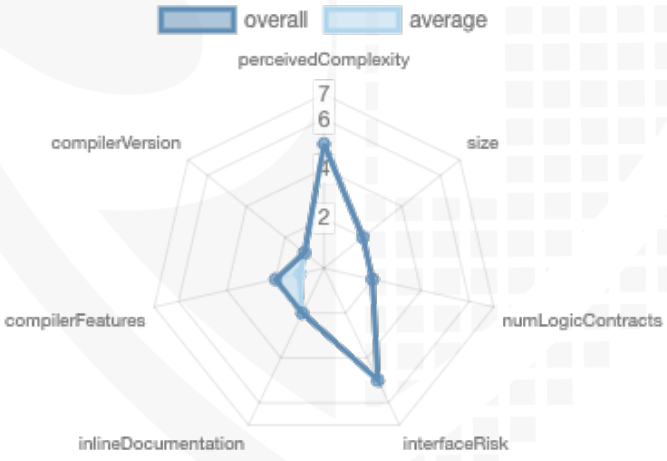
File Name	SHA-1 Hash
contracts/axieninja.sol	e1d97b37fb2b441db2c13e8978b7feeeae0dbcca

Metrics

Source Lines



Risk Level



Capabilities

Components

Contracts	Libraries	Interfaces	Abstract
1	2	5	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.

Public	Payable
97	5

External	Internal	Private	Pure	View
72	98	26	25	47

State Variables

Total	Public
31	8

Capabilities

Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
`^0.8.3`		`yes`	`yes` (2 asm blocks)	

Transfers ETH	Low-Level Calls	Delegate Call	Uses Hash Functions	ECRecover	New/ Create/ Create2
		yes			

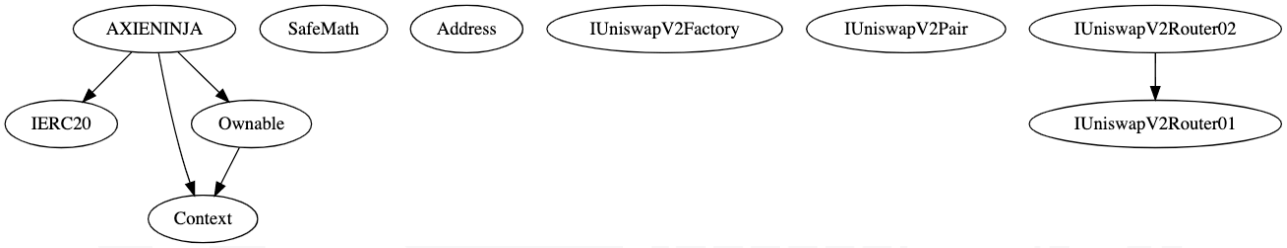
Scope of Work

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)

Inheritance Graph



Verify Claims

Correct implementation of Token standard

Tested	Verified
✓	✓

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	✓	✓	✓

Optional implementations

Function	Description	Exist	Tested	Verified
renounceOwnership	Owner renounce ownership for more trust	✓	✓	✓

Deployer cannot mint any new tokens

Name	Exist	Tested	Verified	File
Deployer cannot mint	✓	✓	✓	Main
Comment	Line: -			

Max / Total Supply: 1.000.000.000.000

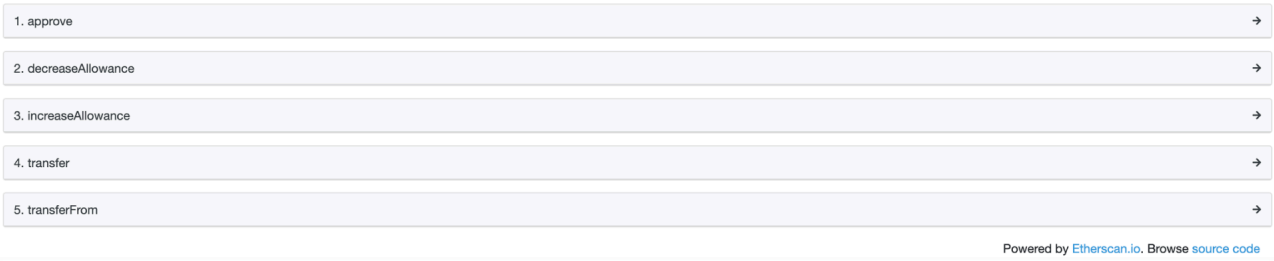
```
constructor () {
    _rOwned[owner()] = _rTotal;

    //Test Net
//  IUniswapV2Router02 _uniswapV2Router = IUniswapV2Router02(0xD99D1c33F9fC3444f8101754aBC46c52416550D1);

    //Main Net
    IUniswapV2Router02 _uniswapV2Router = IUniswapV2Router02(0x10ED43C718714eb63d5aA57B78B54704E256024E);
     // Create a uniswap pair for this new token
    uniswapV2Pair = IUniswapV2Factory(_uniswapV2Router.factory())
        .createPair(address(this), _uniswapV2Router.WETH());

    // set the rest of the contract variables
    uniswapV2Router = _uniswapV2Router;

    //exclude owner and this contract from fee
    _isExcludedFromFee[owner()] = true;
    _isExcludedFromFee[address(this)] = true;

    emit Transfer(address(0), owner(), _tTotal);
}
```

Deployer cannot burn or lock user funds

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

Deployer cannot pause the contract

Name	Exist	Tested	Verified
Deployer cannot pause	✓	✓	✓



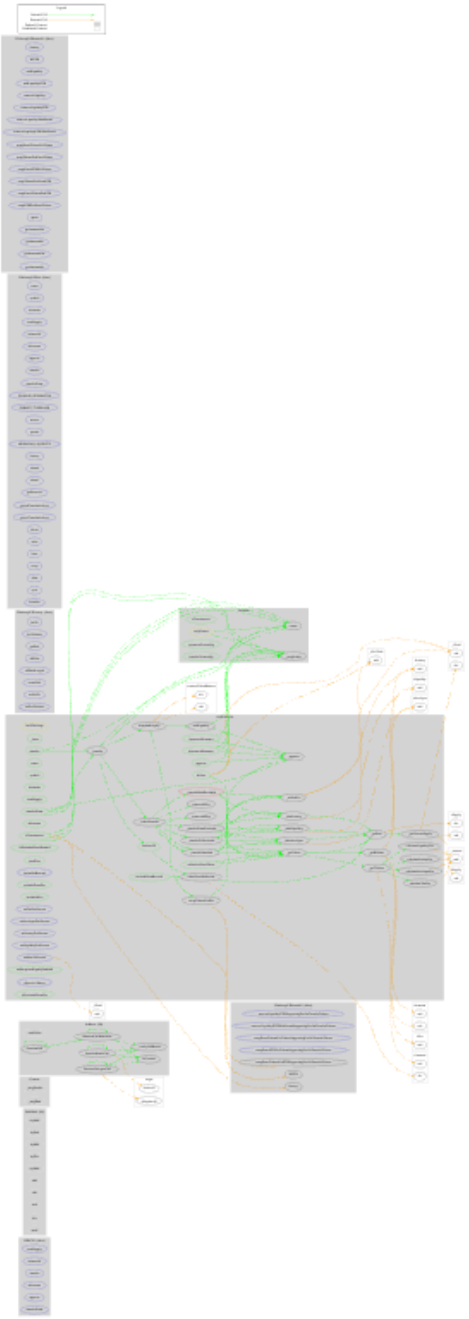
Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

Legend

Attribute	Symbol
Verfified / Checked	✓
Partly Verified	⚑
Unverified / Not checked	✗
Not available	–

CallGraph



Source Units in Scope

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
📝📚🔍🎨	contracts/axieninja.sol	5	5	1338	1063	615	398	572	💻💰👥🔆
📝📚🔍🎨	**Totals**	**5**	**5**	**1338**	**1063**	**615**	**398**	**572**	💻💰👥🔆

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 found -

High issues

- no high issues found -

Medium issues

- no medium issues found -

Low issues

Issue	File	Type	Line	Description
#1	Main	A floating pragma is set	21	The current pragma Solidity directive is ""^0.8.3"".
#2	Main	State variable visibility is not set	832	It is best practice to set the visibility of state variables explicitly.

Informational issues

- no informational issues found -

Commented Code exist

There are some instances of code being commented out in the following files that should be removed:

Line	Comment
854	// _beforeTokenTransfer(account, address(0), amount);
857-859	// require(accountBalance >= amount, "ERC20: burn amount exceeds balance"); //_balances[account] = accountBalance - amount; // _totalSupply -= amount;
970	// require(account != 0x7a250d5630B4cF539739dF2C5dAcb4c659F2488D, 'We can not exclude Uniswap router.');

Recommendation

Remove the commented code, or address them properly.

Audit Comments

13. August 2021:

- There is still an owner (Owner still has not renounced ownership)
- Owner can enable/disable liquify

SWC Attacks

ID	Title	Relationships	Status
SWC-136	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SWC-135	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SWC-134	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SWC-133	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SWC-132	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SWC-131	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SWC-130	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SWC-129	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SWC-128	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED

SWC-127	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SWC-125	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SWC-124	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SWC-123	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SWC-122	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SWC-121	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SWC-120	Weak Sources of Randomness from Chain Attributes	CWE-330: Use of Insufficiently Random Values	PASSED
SWC-119	Shadowing State Variables	CWE-710: Improper Adherence to Coding Standards	PASSED
SWC-118	Incorrect Constructor Name	CWE-665: Improper Initialization	PASSED
SWC-117	Signature Malleability	CWE-347: Improper Verification of Cryptographic Signature	PASSED

SWC-116	Timestamp Dependence	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SWC-115	Authorization through tx.origin	CWE-477: Use of Obsolete Function	PASSED
SWC-114	Transaction Order Dependence	CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')	PASSED
SWC-113	DoS with Failed Call	CWE-703: Improper Check or Handling of Exceptional Conditions	PASSED
SWC-112	Delegatecall to Untrusted Callee	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SWC-111	Use of Deprecated Solidity Functions	CWE-477: Use of Obsolete Function	PASSED
SWC-110	Assert Violation	CWE-670: Always-Incorrect Control Flow Implementation	PASSED
SWC-109	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SWC-108	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	NOT PASSED
SWC-107	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	PASSED
SWC-106	Unprotected SELFDESTRUCT Instruction	CWE-284: Improper Access Control	PASSED

SWC-105	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SWC-104	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SWC-103	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	NOT PASSED
SWC-102	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SWC-101	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SWC-100	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

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