





Smart Contract Audits | Solidty Analysis | Solidty Development | KYC | Project Evulation

SUMMARY

Auditing Firm
Client Firm
Language
Mandatory Audit Check
Final Report

ITNetwork
LMOON
Solidity
Static, Software, Auto Intelligent & Manual Analysis
Date August 16, 2022

Audit Summary

ITNetwork team has performed a line-by-line manual analysis and automated review of the smart contracts. The smart contract was analyzed mainly for common smart contract vulnerabilities, exploits, and manipulation hacks. According to the smart contract audit:

Luna Moon's smart contract source code has LOW RISK SEVERITY
Luna Moon has PASSED the smart contract audit
Luna Moon uses mint to generate governance tokens. The function is
Owner.

For the detailed understanding of risk severity, source code vulnerability, and functional test, kindly refer to the audit. Please note, only a number of Luna Moon contracts from their repository are audited, the contracts make external calls and import various code packages to work effectively, ITNetwork does not provide explicit guarantee on the safety and security of these calls/packages.

Verify the authenticity of this report on ITNetwork's GitHub: https://github.com/itnetworkk

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About ITNetwork

PROJECT OVERVIEW

ITNetwork was consulted by Luna Moon to conduct the smart contract security audit of their solidity source codes

About Luna Moon

Luna Moon is a free-to-play, play-and-earn MMO strategy game. Welcome to the arena! Defeat your battle deck in fast-paced real-time matches! A time and multiplayer game featuring your favorite characters.

The Luna Moon team comprises experienced \$LMOON developers, and seasoned blockchain product and project leads.

PROJECT	Luna Moon	
Blockchain	Binance Smart Chain	
Language	Solidity	
Contracts	0x69660C713C6FCE07f29B538121dC3B17A7455b39	
Website	https://www.lunamoon.tech/	
Telegram	https://t.me/lunamoontoken	
Twitter	https://twitter.com/cryptogemsx1000	
Telegram Turkey	https://t.me/lunamoonturkiye	

PROJECT LOGO



Solidity Source Codes Under Scope

- v MasterChef.sol
- v LMOONToken.sol
- v LMOONVault.sol
- v PancakeFactory.sol
- v PancakePair.sol
- v PancakeRouter.sol
- v PancakeLibrary.sol
- v SmartChefFactory.sol
- v SmartChefInitializable.sol

SHA-1 Hash

SHA-1 Hash Solidity source codes are audited at hash #f7c2bef01d6fcfd87103b0f0cdf4241bb8d0789f

AUDIT SCOPE & METHODOLOGY

The scope of this report is to audit the smart contract source codes of LMOON. ITNetwork has scanned the contract codes and reviewed the project for common vulnerabilities, exploits, hacks, and backdoors. Below is the list of commonly known smart contract vulnerabilities, exploits, and hacks:

Category

Smart Contract Vulnerabilities

v Re-entrancy

v Unhandled Exceptions

v Transaction Order Dependency

v Integer Overflow

v Unrestricted Action

v Incorrect Inheritance Order

v Typographical Errors

v Requirement Violation

v Ownership Takeover

v Gas Limit and Loops

v Deployment Consistency

v Repository Consistency

v Data Consistency

v Token Supply Manipulation

v Access Control and Authorization

v Operations Trail and Event Generation

v Assets Manipulation

v Liquidity Access

Functional Assessment

Source Code Review

Validated by https:/www.it-network.tech

ITNETWORK'S ECHELON AUDIT STANDARD



The aim of ITNetwork's "Echelon" standard is to analyze the smart contract and identify the vulnerabilities and the hacks in the smart contract. Mentioned are the steps used by <u>ECHELON-1</u> to assess the smart contract:

1. Solidity smart contract source code reviewal:

v Review of the specifications, sources, and instructions provided to ITNetwork to make sure we understand the size, scope, and functionality of the smart contract. v Manual review of code, which is the process of reading source code line-byline to identify potential vulnerabilities.

2. Static, Manual, and Software analysis:

v Test coverage analysis, which is the process of determining whether the test cases are covering the code and how much code is exercised when we run those test cases. v 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

Automated 3P frameworks used to assess the smart contract vulnerabilities

v Slither

v Consensys MythX, Mythril

v SWC Registry v Solidity Coverage

v Open Zeppelin Code Analyzer

v Solidity Code Complier

ITNETWORK'S RISK CLASSIFICATION



Smart contracts are generally designed to manipulate and hold funds. This makes them very tempting attack targets, as a successful attack may allow the attacker to directly steal funds from the contract. Below are the typical risk levels of a smart contract:

Vulnerable: A contract is vulnerable if it has been flagged by a static analysis tool as such. As we will see later, this means that some contracts may be vulnerable because of a false-positive.

Exploitable: A contract is exploitable if it is vulnerable and the vulnerability could be exploited by an external attacker. For example, if the "vulnerability" flagged by a tool is in a function which requires to own the contract, it would be vulnerable but not exploitable.

Exploited: A contract is exploited if it received a transaction on the main network which triggered one of its vulnerabilities. Therefore, a contract can be vulnerable or even exploitable without having been exploited.

Risk severity	Meaning
! Critical	This level vulnerabilities could be exploited easily, and can lead to asset loss, data loss, asset manipulation, or data manipulation. They should be fixed right away.
! High	This level vulnerabilities are hard to exploit but very important to fix, they carry an elevated risk of smart contract manipulation, which can lead to critical risk severity
! Medium	This level vulnerabilities are should be fixed, as they carry an inherent risk of future exploits, and hacks which may or may not impact the smart contract execution.
	This level vulnerabilities can be ignored. They are code style violations, and informational statements in the code. They may not affect the smart contract execution

SMART CONTRACT — STATIC ANALYSIS



Symbol	Meaning
	Function can be modified
	Function is payable
	Function is locked
	Function can be accessed
· i	Important functionality
gratorChef;o* I Interf ace 111 L m grate External I NO ! 111111 *****************************	

```
burn | Public | 14f INO |
del tes | Exterl\ill | INO |
del telExterl\ill | | • | NO f | del teBySig | Exterl\ill | | | • | NO | (letCurrentVotes |
Exterl\ill I (NO I (JetPrlorvot es | Exterl\ill I | (NO I | I
_del tellnterl\illil•11
_wrlte<:M-ckpoint | Inter|\ill Q | •
saf e32 | Interl\ill il | |
I (letCl\ainId | Interl\ill il | I
"-cake e"" Y' • • IP.. I Implementat Ion I Ooll\ilble, Pausable III"
I <Constructor> | Public | I • INO | |
"depos lt | Exterl\ill | 14f | ""'4'lenNotPaused notContract wlt.l'MirawAll | Exterl\ill | 1 •
I notContract I"
"I\arvest | Exterl\ill f | 18 | notContract ""'4'lenNotPaused setActnin | Exterl\ill | 1 • |
onlyCM'ler I"
set Treasury | Exterl\ill | | | • | onlyCM'ler |
set Perf ormanceFee | Exterl\ill | | 18 | onlyAdt11J| setcallFee | Exterl\ill | | 1 • |
onlyAd111J1 | setWl.t r.drawf ee | Exterl\ill f | 18 | onlyAdt11J1 |
setWitl'MirawFeePeriod | Exterl'lil | | 1 • | onlyAdt11J| nc-Ml.thdraw; | Exterl\ill | | 18 |
onlyAdt11J11
ineaseTokensGetSt uck | Exterl'lill | I • I onlyAdt11J1
"I Exterl\ill | | 8 | 011lyAd1'1J1 ""'4'1enNotPaused | "
Exterl\ill | (NO |"
c.alculat eTotalPel'MiikeRewards | External | INO (JetPricePerFullSI\are | Exterrlal | |
INO I
wlt.l'Miraw | Public | I • | I | IOtContract | available | Public f | INO f |
balanceOf | Public f | INO f |
_earn| Interl\ill il 8 | |
_ iscont ract | Interl\ill il | |
-PaftcakeFactorr- I Implementat on I IPancakeFactory 111
| | Constructor | Public | | | NO | |
I allPairsleth | Exterl\ill f | INO f | I createPair | Exterl\ill | I • INO ! I
| set.FeeTo | Exterl\ill ! | • INO | |
| le:tll.Lhca.F | Exterl\ill!| 4f INO!
| (JetExcl\a*Fee | Exterl\ill | NO | | setFeeSl\are | Exterl\ill | NO | |
| set.FeeActnin | Exterl\ill | | • INO | |
"-PaftcakePai,._ Implementat ion | 1Panc.akePa 1r , PancakeERC20 111"
I (letReserves Public I I (NO f I
saf eTransf er | Private lii | 4il | |
<Constructor> | Public | | • INO |
```

```
| L | initialize | External||NO | | | | | |
| L | _mintFee | Private|| |
| └| mint | External| | lock |
| L | burn | External | lock |
| L|swap|External||lock|
| └| skim | External| | lock |
| L|sync|External||lock| |||||
| **PancakeRouter** | Implementation | IPancakeRouter02 |||
| └ | <Constructor> | Public | |NO |
| <sup>L</sup> | _addLiquidity | Internal | ||
| L | addLiquidity | External | | ensure |
| L | removeLiquidity | Public | | ensure |
| L | removeLiquidityETH | Public | | ensure |
| L | removeLiquidityWithPermit | External | NO |
| L | removeLiquidityETHWithPermit | External | | NO |
| L | removeLiquidityETHSupportingFeeOnTransferTokens | Public | | ensure |
| L | removeLiquidityETHWithPermitSupportingFeeOnTransferTokens | External | |NO | | L |
_swap | Internal | | |
| L|swapExactTokensForTokens|External||ensure||L|swapTokensForExactTokens|
External | ensure | Language | External | ensure |
| L|swapTokensForExactETH|External||ensure||L|swapExactTokensForETH|External||
ensure | | L | swapETHForExactTokens | External | | ensure |
| L | _swapSupportingFeeOnTransferTokens | Internal | | |
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External | ensure | | L |
swapExactETHForTokensSupportingFeeOnTransferTokens | External | | ensure |
| L | swapExactTokensForETHSupportingFeeOnTransferTokens | External | | ensure | | | | | |
| └ | quote | Public| |NO |
| └ | getAmountOut | Public | NO |
| L | getAmountIn | Public | NO |
| └ | getAmountsOut | Public | NO |
| **PancakeLibrary** | Library | | ||
| └|sortTokens|Internal|| |
| L|getReserves|Internal|| |
| └ | getAmountOut | Internal | |
| L | getAmountIn | Internal | | |
| L | getAmountsIn | Internal | | | | | | | |
| **SmartChefFactory** | Implementation | Ownable |||
| └ | <Constructor> | Public | |NO |
```

L	allPoolsLength	External		NO						
L	deployPool	External	onlyOwner							
SmartChefInitializable	Implementation	Ownable, ReentrancyGuard								
L	<Constructor>	Public		NO						
L	initialize	External		NO						
L	deposit	External		nonReentrant		L	withdraw	External		nonReentrant
L	emergencyWithdraw	External		nonReentrant						
L	emergencyRewardWithdraw	External		onlyOwner						
L	recoverWrongTokens	External		onlyOwner						
L	updatePoolLimitPerUser	External		onlyOwner						
L	updateRewardPerBlock	External		onlyOwner						
L	updateStartAndEndBlocks	External		onlyOwner						

| L | pendingReward | External | |NO |



Function Signatures

```
26465826 => setCallFee(uint256)
32749461 => getReserves(address,address,address)
74496190 => setMigrator(IMigratorChef)
ef171420 => migrate(IBEP20)
5ffe6146 => updateMultiplier(uint256)
01f8a976 => updateRewardPerBlock(uint256)
081e3eda => poolLength()
0812e2c5 => add(uint256,IBEP20,bool)
64482f79 => set(uint256,uint256,bool)
9b9c4477 => updateStakingPool()
454b0608 => migrate(uint256)
95f86d80 => migrateControl(address)
8dbble3a => getMultiplier(uint256,uint256)
1175aldd => pendingCake(uint256,address)
630b5ba1 => massUpdatePools()
51eb05a6 => updatePool(uint256)
e2bbb158 => deposit(uint256,uint256)
441a3e70 => withdraw(uint256,uint256)
41441d3b => enterStaking(uint256)
1058d281 => leaveStaking(uint256)
5312ea8e => emergencyWithdraw(uint256)
a2e6ddcc => safeCakeTransfer(address,uint256)
d0d4lfel => setDevAddress(address)
03c0fa01 => setDevShare(uint256)
bflbbdae => setShareTo(address)
40c10f19 => mint(address,uint256)
42966c68 => burn(uint256)
587cdele => delegates(address)
5c19a95c => delegate(address)
c3cda5202=>delegateBySig(address,uint256,uint256,uint8,bytes32,bytes32)
b4b5ea57 => getCurrentVotes(address)
782d6fe1 => getPriorVotes(address,uint256)
a28a42b3 => _delegate(address,address)
955f9fd8 => _moveDelegates(address,address,uint256)
ee59e77f => _writeCheckpoint(address,uint32,uint256,uint256)
869d1f83 => safe32(uint256,string)
3408e470 => getChainId()
b6b55f25 => deposit(uint256)
853828b6 => withdrawAll()
4641257d => harvest()
704b6c02 => setAdmin(address)
f0f44260 => setTreasury(address)
70897b23 => setPerformanceFee(uint256)
b6ac642a => setWithdrawFee(uint256)
lefac1b8 => setWithdrawFeePeriod(uint256)
```

```
db2e2lbc => emergencyWithdraw()
def68a9c => inCaseTokensGetStuck(address)
8456cb59 => pause()
3f4ba83a => unpause()
9d72596b => calculateHarvestCakeRewards()
58ebceb6 => calculateTotalPendingCakeRewards()
77c7b8fc => getPricePerFullShare()
2ela7d4d => withdraw(uint256)
48a0d754 => available()
722713f7 => balanceOf() 6f48813d => _earn()
7d48441f => _isContract(address)
574f2ba3 => allPairsLength()
c9c65396 => createPair(address,address)
f4690led => setFeeTo(address)
692eb56f => setExchangeFee(address,uint256)
5f4153f7 => getExchangeFee(address)
b3cba4a2 => setFeeShare(uint256)
6eb2d031 => setFeeAdmin(address)
0902flac => getReserves()
26e6cdde => _safeTransfer(address,address,uint256)
485cc955 => initialize(address,address)
7dc0alfa => _update(uint256,uint256,uint112,uint112)
f65d5f86 => _mintFee(uint112,uint112)
6a627842 => mint(address)
89afcb44 => burn(address)
022c0d9f => swap(uint256,uint256,address,bytes)
bc25cf77 => skim(address) fff6cae9 => sync()
6d7746bc => _addLiquidity(address,address,uint256,uint256,uint256,uint256)
e8e33700 => addLiquidity(address,address,uint256,uint256,uint256,uint256,address,uint256) f305d719 =>
addLiquidityETH(address,uint256,uint256,uint256,address,uint256)
baa2abde => removeLiquidity(address,address,uint256,uint256,uint256,address,uint256) 02751cec =>
removeLiquidityETH(address,uint256,uint256,uint256,address,uint256)
2195995c=>removeLiquidityWithPermit(address,address,uint256,uint256,uint256,address,uint256,bool,uin
t8,bytes3 2,bytes32)
ded9382a=>removeLiquidityETHWithPermit(address,uint256,uint256,uint256,address,uint256,bool,uint8,b
ytes32,byt es32)
af2979eb=removeLiquidityETHSupportingFeeOnTransferTokens(address,uint256,uint256,uint256,address,
uint256)
5b0d5984 =>
remove Liquidity ETHW ith Permit Supporting Fee On Transfer Tokens (address, uint 256, uint 256, uint 256, address, uint 256, uint 256
u int256,bool,uint8,bytes32,bytes32)
f5901d4d => _swap(uint256[],address[],address)
38ed1739 => swapExactTokensForTokens(uint256,uint256,address[],address,uint256)
8803dbee => swapTokensForExactTokens(uint256,uint256,address[],address,uint256)
```

7ff36ab5 => swapExactETHForTokens(uint256,address[],address,uint256)

4a25d94a => swapTokensForExactETH(uint256,uint256,address[],address,uint256)

```
18cbafe5 => swapExactTokensForETH(uint256,uint256,address[],address,uint256)
fb3bdb41 => swapETHForExactTokens(uint256,address[],address,uint256)
dlc474e3 => _swapSupportingFeeOnTransferTokens(address[],address)
5c11d795swapExactTokensForTokensSupportingFeeOnTransferTokens(uint256,uint256,address[],address,
uint256)
b6f9de95=>swapExactETHForTokensSupportingFeeOnTransferTokens(uint256,address[],address,uint256)
791ac947=>swapExactTokensForETHSupportingFeeOnTransferTokens(uint256,uint256,address[],address,
uint256)
ad615dec => quote(uint256,uint256,uint256) 054d50d4 => getAmountOut(uint256,uint256,uint256)
85f8c259 => getAmountIn(uint256,uint256,uint256)
d06ca61f => getAmountsOut(uint256,address[])
1f00ca74 => getAmountsIn(uint256,address[])
544caa56 => sortTokens(address,address)
6d91c0e2 => pairFor(address,address,address)
cef496b1 => getAmountOut(address,address,uint256,uint256,uint256)
fldfeabe => getAmountIn(address,address,uint256,uint256,uint256)
bb7b9c76 => getAmountsOut(address,uint256,address[])
192128b2 => getAmountsIn(address,uint256,address[])
efde4e64 => allPoolsLength()
eb8bfb05 => deployPool(IBEP20,IBEP20,uint256,uint256,uint256,uint256,address)
48cf8750 => initialize(IBEP20,IBEP20,uint256,uint256,uint256,uint256,address)
3279beab => emergencyRewardWithdraw(uint256)
3f138d4b => recoverWrongTokens(address,uint256)
80dc0672 \Rightarrow stopReward()
a0b40905 => updatePoolLimitPerUser(bool,uint256)
9513997f => updateStartAndEndBlocks(uint256,uint256)
f40f0f52 => pendingReward(address)
2061e1e5 => _updatePool()
8e356d7a => _getMultiplier(uint256,uint256)
```

SMART CONTRACT — SWC ATTACKS



SWC ID	<u>Description</u>	<u>Verdict</u>
SWC - 101	Integer Overflow and Underflow	
SWC - 102	Outdated Compiler Version	
SWC - 103	Floating Pragma	
SWC - 104	Unchecked Call Return Value	
SWC - 105	Unprotected Ether Withdrawal	
SWC - 106	Unprotected SELFDESTRUCT Instruction	
SWC - 107	Re-entrancy	
SWC - 108	State Variable Default Visibility	
SWC - 109	Uninitialized Storage Pointer	
SWC - 110	Assert Violation	
SWC - 111	Use of Deprecated Solidity Functions	
SWC - 112	Delegate Call to Untrusted Callee	
SWC - 113	DoS with Failed Call	
SWC - 114	Transaction Order Dependence	
SWC - 115	Authorization through tx.origin	
SWC - 116	Block values as a proxy for time	
SWC - 117	Signature Malleability	
SWC - 118	Incorrect Constructor Name	

SMART CONTRACT — SWC ATTACKS



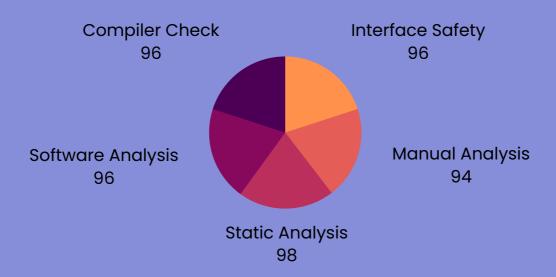
SWC ID	<u>Description</u>	<u>Verdict</u>
SWC - 119	Shadowing State Variables	
SWC - 120	Weak Sources of Randomness from Chain Attributes	
SWC - 121	Missing Protection against Signature Replay Attacks	
SWC - 122	Lack of Proper Signature Verification	
SWC - 123	Requirement Violation	
SWC - 124	Write to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

SMART CONTRACT - RISK STATUS & RADAR CHART



<u>Risk Severity</u>	<u>Status</u>
! Critical	None critical severity issues identified
! High	None high severity issues identified
! Medium	None medium severity issues identified
! Low	2 low severity issues identified
Verified	54 functions and instances verified and checked
Safety Score	98 out of 100

Status Score out of 100



AUDITOR'S VERDICT



ITNetwork team has performed a line-by-line manual analysis and automated review of the smart contract. The smart contract was analyzed mainly for common smart contract vulnerabilities, exploits, and manipulation hacks.

\$LMOON's smart contract source code has LOW RISK SEVERITY.
\$LMOON has \$45550 the smart contract audit.

Note for stakeholders

- Be aware that active smart contract owner privileges constitute an elevated impact on smart contract's safety and security.
- Make sure that the project team's KYC/identity is verified by an independent firm, e.g., ITNetwork.

IMPORTANT DISCLAIMER



ITNetwork provides contract auditing and project verification services for blockchain projects. The purpose of the audit is to analyse the on-chain smart contract source code, and to provide basic overview of the project. This report should not be transmitted, disclosed, referred to, or relied upon by any person for any purposes without ITNetwork's prior written consent.

ITNetwork provides the easy-to-understand assessment of the project, and the smart contract (otherwise known as the source code). The audit makes no statements or warranties on the security of the code. It also cannot be considered as an enough assessment regarding the utility and safety of the code, bug-free status, or any other statements of the contract. While we have used all the data at our disposal to provide the transparent analysis, it is important to note that you should not rely on this report only — we recommend proceeding with several independent audits and a public bug bounty program to ensure the security of smart contracts. Be aware that smart contracts deployed on a blockchain aren't resistant from external vulnerability, or a hack. Be aware that active smart contract owner privileges constitute an elevated impact to smart contract's safety and security. Therefore, ITNetwork does not guarantee the explicit security of the audited smart contract.

The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed

This report should not be considered as an endorsement or disapproval of any project or team. The information provided on this report does not constitute investment advice, financial advice, trading advice, or any other sort of advice and you should not treat any of the report's content as such. Do conduct your own due diligence and consult your financial advisor before making any investment decisions.

ABOUT ITNETWORK



ITNetwork provides intelligent blockchain solutions. ITNetwork is developing an ecosystem that is seamless and responsive. Some of our services: Blockchain Security, Token Launchpad, NFT Marketplace, etc. ITNetwork's mission is to interconnect multiple services like Blockchain Security, DeFi, Gaming, and Marketplace under one ecosystem that is seamless, multi-chain compatible, scalable, secure, fast, responsive, and easy-to-use.

ITNetwork is built by a decentralized team of UI experts, contributors, engineers, and enthusiasts from all over the world. Our team currently consists of 6+ core team members, and 10+ casual contributors. ITNetwork provides manual, static, and automatic smart contract analysis, to ensure that project is checked against known attacks and potential vulnerabilities.

To learn more, visit https://it-network.tech
To view our audit portfolio, visit https://github.com/itnetworkk
To book an audit, message https://t.me/ITNetworkGlobal

