SOLIDProof

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MADE IN GERMANY

Audit

Security Assessment

19. January, 2022

For

MetaGLX

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Version	Date	Description
1.0	19. January 2022	• Layout project • Automated- /Manual-Security Testing • Summary

Network
Binance Smart Chain (BEP20)

Website
https://metaglx.com/

Telegram
https://telegram.me/MetaGLX

Twitter
https://twitter.com/MetaGLX

Reddit
https://www.reddit.com/r/MetaGLX/

Discord
https://discord.gg/uEwGcHPZRQ

Youtube
https://www.youtube.com/channel/UC4wilYrn-o-eE32ha9irrYw/

Description

MetaGLX is a futuristic, fast-paced and **First-ever Play-to-Earn** turn-based **NFT Racing Game** inspired by the WipEout and F-Zero series. MetaGLX employs this **Play-to-Earn** model to reward players with MGLX tokens through dynamic gameplay and participation in Multiplayer PvP tournaments in the upcoming seasons. With this seamless combination of the **Racing Game** and **Play-to-Earn** models, MetaGLX gives players the opportunity to play and earn rewards at the same time.

Project Engagement

During the 14th of January 2022, **Meta GLX 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

- https://bscscan.com/address/0xABF78B8Af3af5E113209C0996451787Dc5881Eed#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.

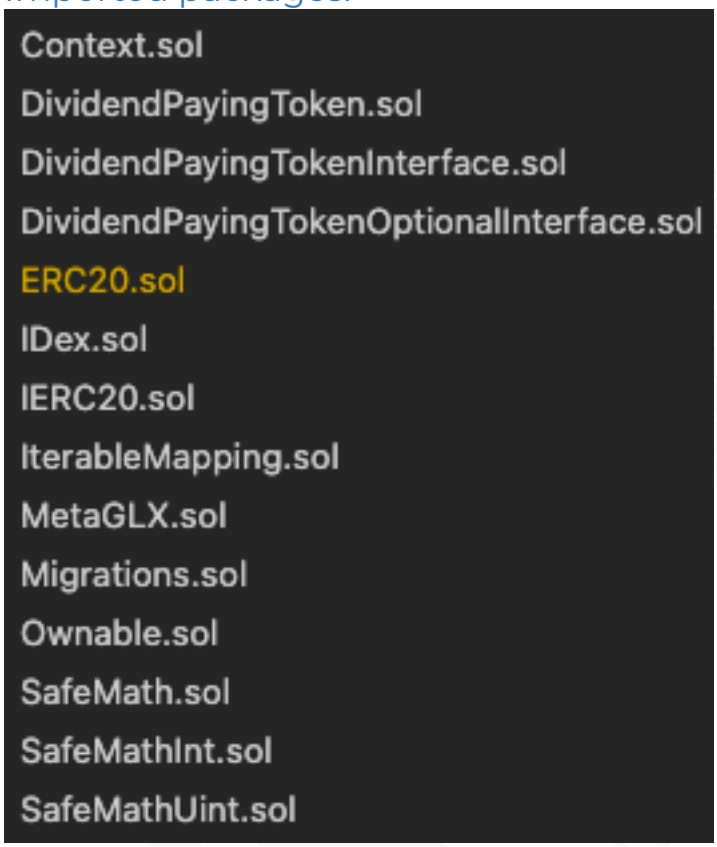
2. Testing and automated analysis that includes the following:
    i) Test coverage analysis, which is the process of determining whether the test cases are actually covering the code and how much code is exercised when we run those test cases.
    ii) Symbolic execution, which is analysing a program 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:



Tested Contract Files

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

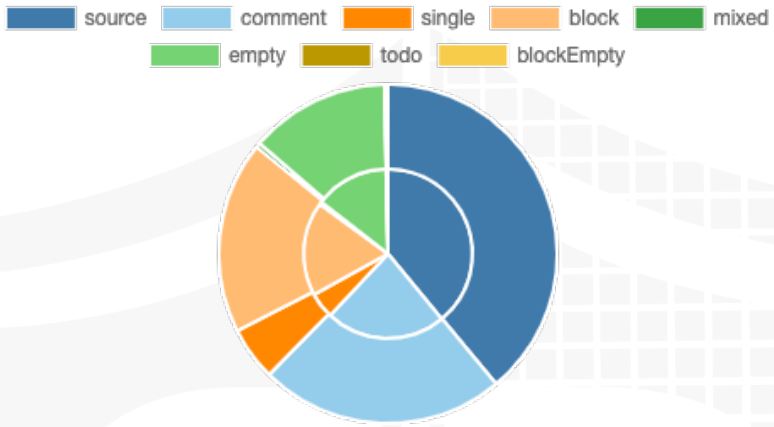
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

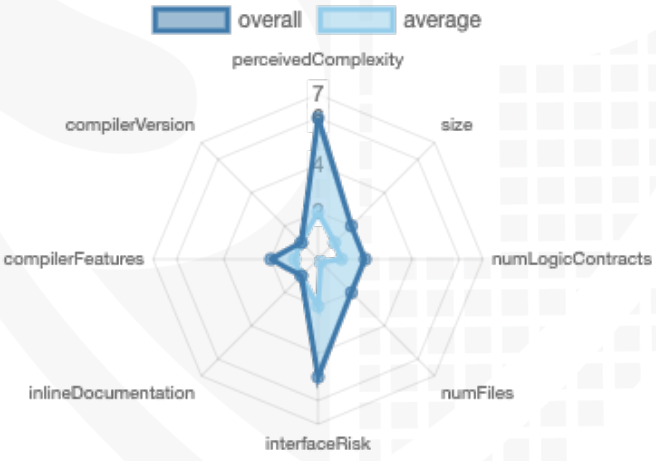
File Name	SHA-1 Hash
contracts/DividendPayingToken.sol	f0cd53a68f8d09cb96a20df02a6a86c1450705fe
contracts/SafeMathUint.sol	f01b6d09889775f3b20f7e837f1a1a8220417b80
contracts/Context.sol	a46126e276d4239728677378aee3bd2cb11a3e4c
contracts/DividendPayingTokenInterface.sol	eb09d354790601507cc8bf05b159821c73f691ee
contracts/MetaGLX.sol	5580761b6162307e4cd6710c93f805c3f00cad15
contracts/SafeMathInt.sol	c37c658ead8ea227ca6778e43cc8d548d77c9dcd
contracts/SafeMath.sol	455b0270cbb768707600768dc1eac8e5c2e0696b
contracts/Ownable.sol	f9fce42d2ba6134ced5814c6e075b7902e996d53
contracts/IterableMapping.sol	2a053103d2a1494c508f4a0b35db876f18746633
contracts/ERC20.sol	5a08b1a0c7ae5ced1678a049aa23d5c01d1bd11f
contracts/DividendPayingTokenOptionalInterface.sol	80260ceb8bec1473e8b34b3d1175752b051c7f20
contracts/IERC20.sol	3dbc28fcda1fad67210113d4b3ac2432ebece610
contracts/IDex.sol	f4c8faab2685bf8c05fd0a6e0a419ccca03afde3

Metrics

Source Lines
v1.0



Risk Level
v1.0



Capabilities

Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	5	4	6	1

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	95	3

Version	External	Internal	Private	Pure	View
1.0	54	101	9	19	44

State Variables

Version	Total	Public
1.0	47	32

Capabilities

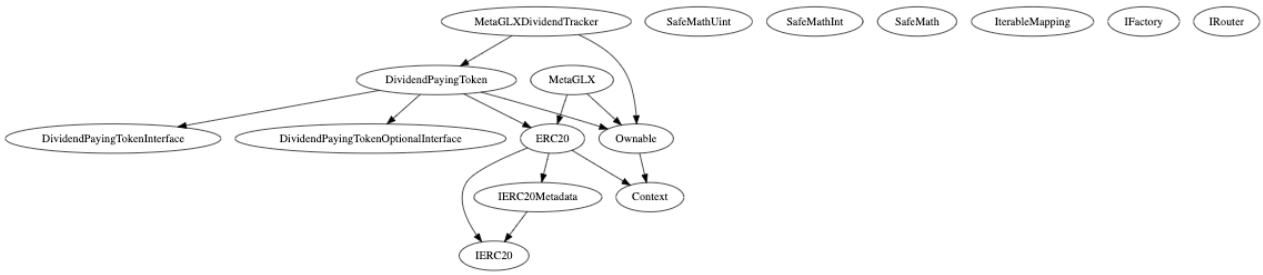
Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	`^0.8.6`		`yes`		

Version	Transfers ETH	Low-Level Calls	DelegateCall	Uses Hash Functions	ECRecover	New/Create/Create2

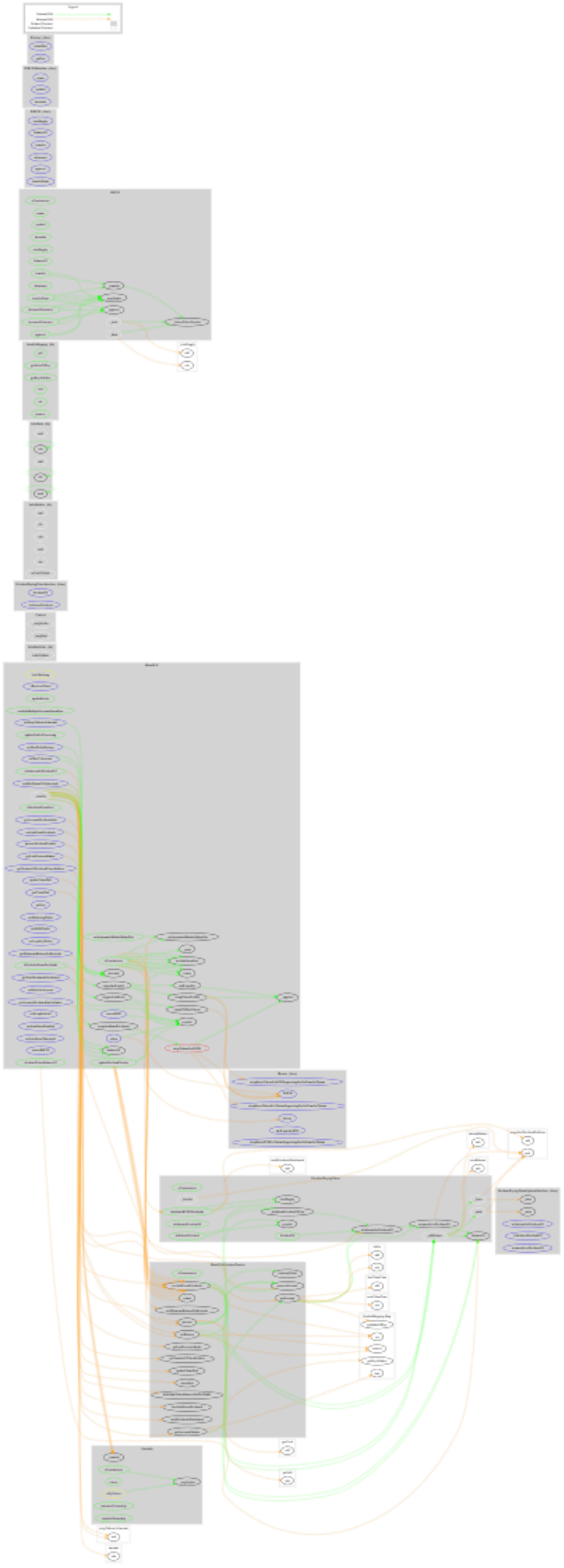
1.0	`yes`					`yes → NewContract:MetaGLXDividendTracker`

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. External approve function is restricted
6. 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

1. approve
2. claim
3. decreaseAllowance
4. excludeFromDividends
5. excludeFromFees
6. excludeMultipleAccountsFromFees
7. increaseAllowance
8. processDividendTracker
9. renounceOwnership
10. rescueBEP20
11. rescueBNB
12. setAutoBoostEnabled
13. setAutoBoostThreshold
14. setAutomatedMarketMakerPair
15. setBlacklistAccount
16. setFees
17. setLiquidityWallet
18. setMarketingWallet
19. setMaxTxAmount
20. setMaxWalletBalance
21. setMinTokensToGetrewards
22. setSwapEnabled
23. setSwapTokensAtAmount
24. setiBNBWallet
25. transfer
26. transferFrom
27. transferOwnership
28. updateClaimWait
29. updateDividendTracker
30. updateGasForProcessing
31. updateRouter

Deployer cannot mint any new tokens

Name	Exist	Tested	Status
Deployer cannot mint	✓	✓	✓
Max / Total Supply	1.000.000.000.000.000		

Comments:

v1.0

- Set Balance function is using mint/burn function in DividendPayingToken

Deployer cannot burn or lock user funds

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

Comments:

v1.0

- Set Balance function is using mint/burn function in DividendPayingToken
- Deployer can lock user funds by
  - Setting address as blacklist
  - Setting maxWalletBalance to 0

Deployer cannot pause the contract

Name	Exist	Tested	Status
Deployer cannot pause	–	–	–

External approve function is restricted

Name	Exist	Tested	Status
External approve cannot be called without restriction	–	–	–

Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

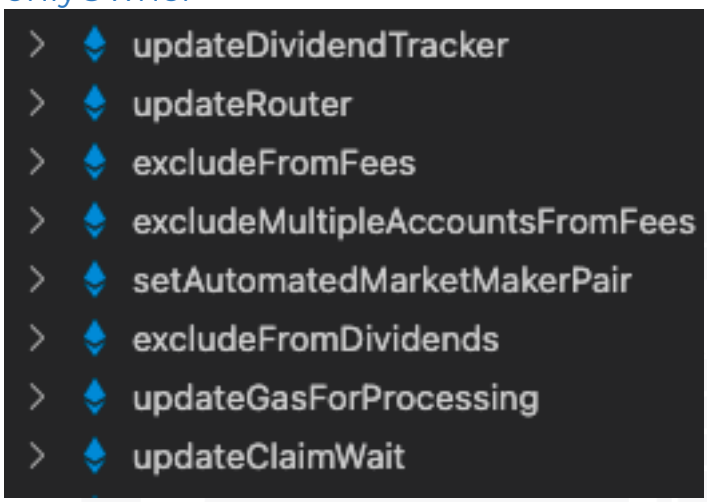
Legend

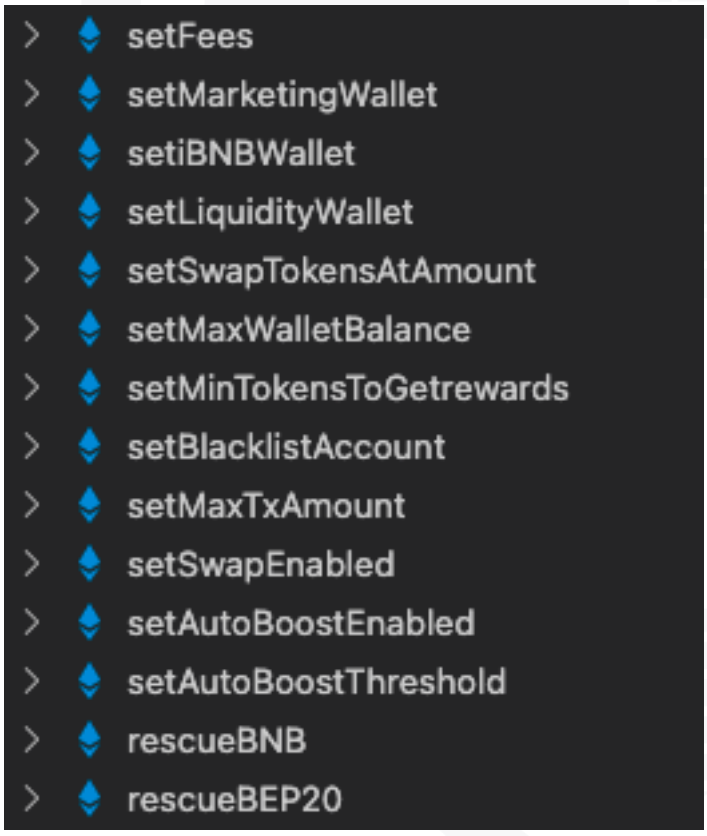
Attribute	Symbol
Verfified / Checked	✓
Partly Verified	⚑
Unverified / Not checked	✗
Not available	-

Modifiers and public functions

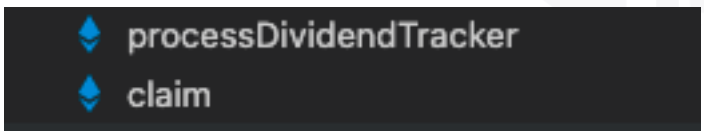
v1.0

onlyOwner





Public



Comments

- Deployer can set following state variables without any limitations
  - swapTokensAtAmount
  - maxWalletBalance

- minimumTokenBalanceForDividends
- autoBoostThreshold

- Deployer can enable/disable following state variables
  - _isExcludedFromFees
  - automatedMarketMakerPairs
  - excludedFromDividends
  - _isBlacklisted
  - swapEnabled
  - autoBoostEnabled

- OnlyOwner can
  - rescueBNB from contract
  - Rescue any BEP20 token from contract

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/DividendPayingToken.sol	1	———	173	173	87	52	77	🔹
📚	contracts/SafeMathUint.sol	1	———	15	15	8	5	3	———
🎨	contracts/Context.sol	1	———	24	24	10	12	1	———
🔍	contracts/DividendPayingTokenInterface.sol	———	1	36	13	3	16	5	———
📝	contracts/MetaGLX.sol	2	———	800	760	511	77	477	💰🔹🌀♻️
📚	contracts/SafeMathInt.sol	1	———	92	92	33	47	16	———
📚	contracts/SafeMath.sol	1	———	146	146	39	93	10	✳️
📝	contracts/Ownable.sol	1	———	57	57	27	21	23	✳️
📚	contracts/IterableMapping.sol	1	———	63	63	49	2	19	———
📝	contracts/ERC20.sol	1	———	309	293	84	178	80	———
🔍	contracts/DividendPayingTokenOptionalInterface.sol	———	1	25	13	3	14	7	———
🔍	contracts/IERC20.sol	———	2	103	37	19	71	22	✳️
🔍	contracts/IDex.sol	———	2	43	7	4	1	24	💰
📝📚🔍🎨	**Totals**	**10**	**6**	**1886**	**1693**	**877**	**589**	**764**	💰🔹🌀✳️♻️

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	MetaGLX	Unchecked tokens transfer	392	Use `SafeERC20`, or ensure that the transfer/ transferFrom return value is checked

Low issues

Issue	File	Type	Line	Description
#1	All	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	All	A floating pragma is set	3	The current pragma Solidity directive is „"^0.8.6"".
#3	MetaGLX	Missing Zero Address Validation (missing-zero-check)	348, 340, 344	Check that the address is not zero
#4	DividendPayingToken	Local variables shadowing	122, 50, 98, 105, 112	Rename the local variables that shadow another component

#5	MetaGLX	Missing Events Arithmetic	382, 329, 369, 356, 352	Emit an event for critical parameter changes

Informational issues

Issue	File	Type	Line	Description
#1	MetaGLX	State variables that could be declared constant (constable-states)	92	Add the `constant` attributes to state variables that never change
#2	MetaGLX	Unused return values	527, 318	Ensure that all the return values of the function calls are used and handle both success and failure cases if needed by the business logic
#3	Context	Functions that are not used	20	Remove unused functions
#4	SafeMath	Functions that are not used	126, 142, 82,	Remove unused functions
#5	SafeMathInt	Unused state variables	36	Remove unused state variables

#6	DividendPayingToken	Unecessary code	135-137	Remove red part from following code
				
				function _transfer(address from, address to, uint256 value) internal virtual override {
				require(false);
				
				int256 _magCorrection = magnifiedDividendPerShare.mul(value).toInt256Safe();
				
				magnifiedDividendCorrections[from] = magnifiedDividendCorrections[from].add(_magCorrection);
				
				magnifiedDividendCorrections[to] = magnifiedDividendCorrections[to].sub(_magCorrection);
				}

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.

19. January 2022:

- Read whole report for more information

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	NOT 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	NOT 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	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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