



**GAIA WORLD**  
**LP Wrapper**  
**SMART CONTRACT AUDIT**  
**14.12.2021**

**Made in Germany by Chainsulting.de**



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## 1. Disclaimer

The audit makes no statements or warranties about utility of the code, safety of the code, suitability of the business model, investment advice, endorsement of the platform or its products, regulatory regime for the business model, or any other statements about fitness of the contracts to purpose, or their bug free status. The audit documentation is for discussion purposes only.

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Major Versions / Date	Description
0.1 (10.12.2021)	Layout
0.2 (13.12.2021)	Test Deployment
0.5 (14.12.2021)	Automated Security Testing Manual Security Testing
0.6 (14.12.2021)	Testing SWC Checks
0.7 (14.12.2021)	Verify Claims
0.9 (14.12.2021)	Summary and Recommendation
1.0 (14.12.2021)	Final document
1.1 (14.12.2021)	Added deployed contract addresses

## 2. About the Project and Company

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**Twitter:** <https://twitter.com/GaiaEverWorld>

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## 2.1 Project Overview

Gaia Everworld blends classic fantasy narratives with state of the art blockchain and NFT technology. In the multi-realm gaming environment, players will be able to use their Gaia Legionnaires to wage campaigns, defend lands, and other immersive activities. Like many other games, like Pokemon, or Clash of Clans, Gaia Everworld allows players to own their characters, and interact in a dynamic environment with other human players all over the world.

The gaming environment allows for players to choose a homeland, which will give their NFT-based Gaia special powers, as well as weaknesses. The game uses a play-to-earn model, so that players have a financial incentive to join and play.

In Gaia Everworld, they offer players the ability to exist in a multi-realm online environment and participate in both PVP Battles and Legion Mode. The game centers on Gaia — a mythical creature that can be bred and owned in the form of an NFT. The underlying goal of the game is to have the strongest collection of Gaia. With these NFT creatures, players can battle other players in the game, and conquer the lands of Gaia Everworld.

Of course, Gaia can be bred and added to a collection of other Gaia — or sold to other players. The two tokens that make the platform work are \$GAIA, which can be staked, and \$GGP, which is needed to breed Gaia.

- Holders of \$GAIA can stake coins to earn \$GAIA.
- Players to earn \$GAIA and \$GGP (Gaia Growth Potion) by playing the game and participating in events and adventures.
- Players to trade or sell their Gaia, Gaia eggs, land and resources in the Gaia Everworld marketplace.
- Players to loan their Gaia to other players in a peer to peer contract. The owner then earns a percentage of the \$GGP earned by the loanees game play.

With NFT based games, players are also the owners of the game, and can control the platform to a much higher level than ever before.

### 3. 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

## 4. 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.

### 4.1 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 Chainsulting 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 Chainsulting 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.

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

Dependency / Import Path	Source
contracts/interfaces/IUniswapV2Pair.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Pair.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Pair.sol</a>
contracts/libraries/SafeMath.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/SafeMath.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/SafeMath.sol</a>
contracts/UniswapV2ERC20.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/UniswapV2ERC20.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/UniswapV2ERC20.sol</a>
contracts/libraries/Math.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/Math.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/Math.sol</a>
contracts/libraries/UQ112x112.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/UQ112x112.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/libraries/UQ112x112.sol</a>
contracts/interfaces/IERC20.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IERC20.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IERC20.sol</a>
contracts/interfaces/IUniswapV2Factory.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/UniswapV2Factory.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/UniswapV2Factory.sol</a>
contracts/interfaces/IUniswapV2Callee.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Callee.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Callee.sol</a>
contracts/UniswapV2Pair.sol	<a href="https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Pair.sol">https://github.com/Uniswap/v2-core/blob/master/contracts/interfaces/IUniswapV2Pair.sol</a>

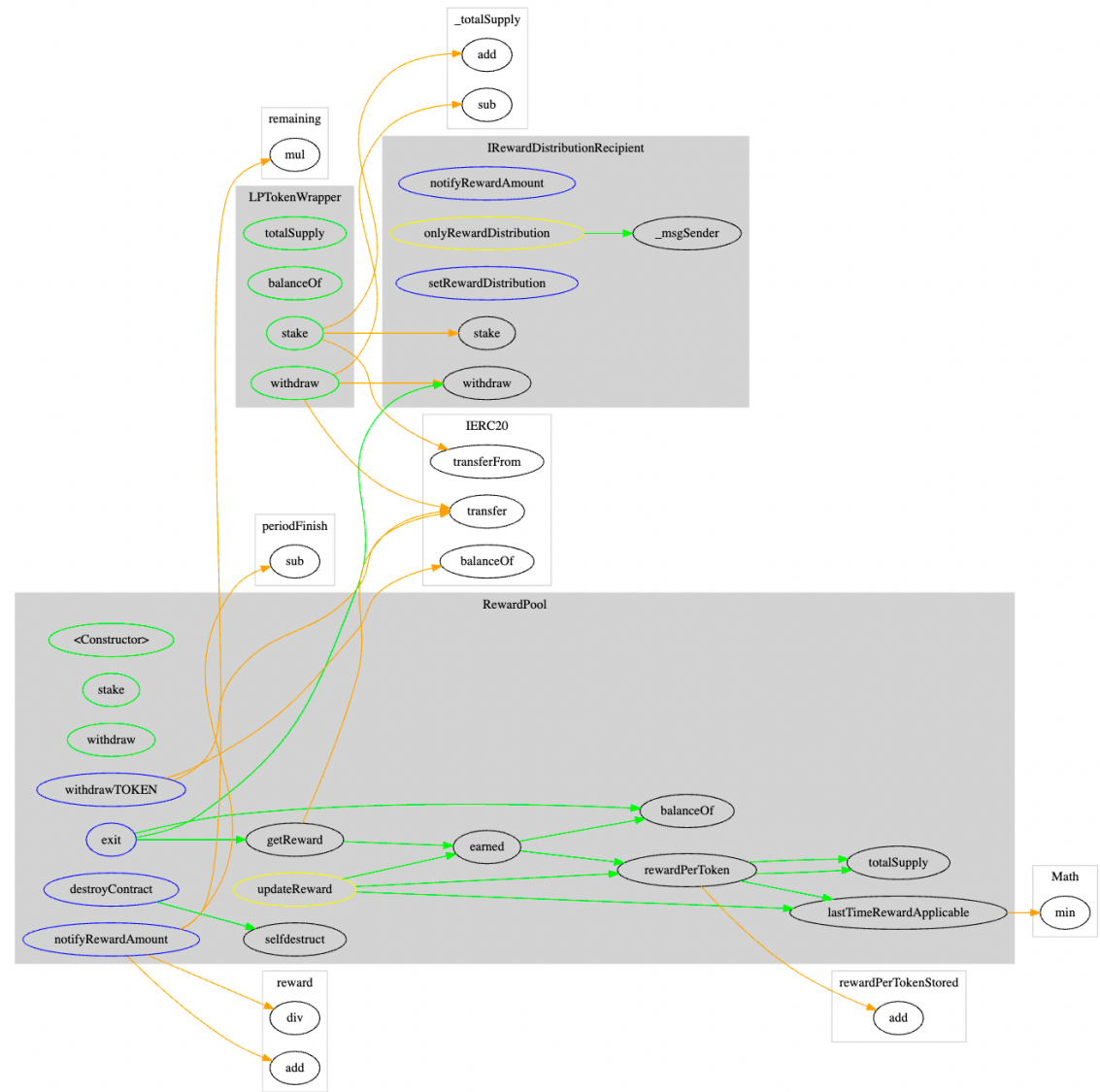
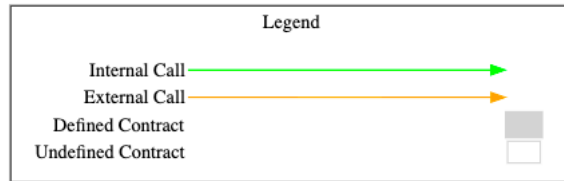


## 4.3 Tested Contract Files

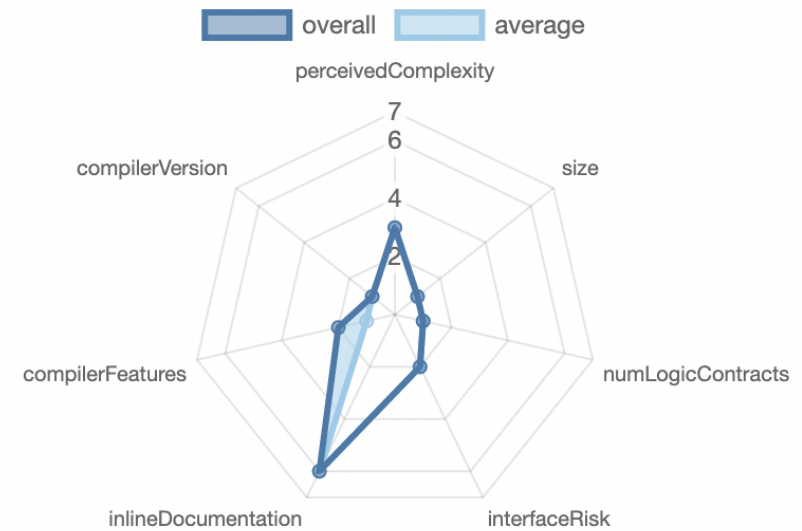
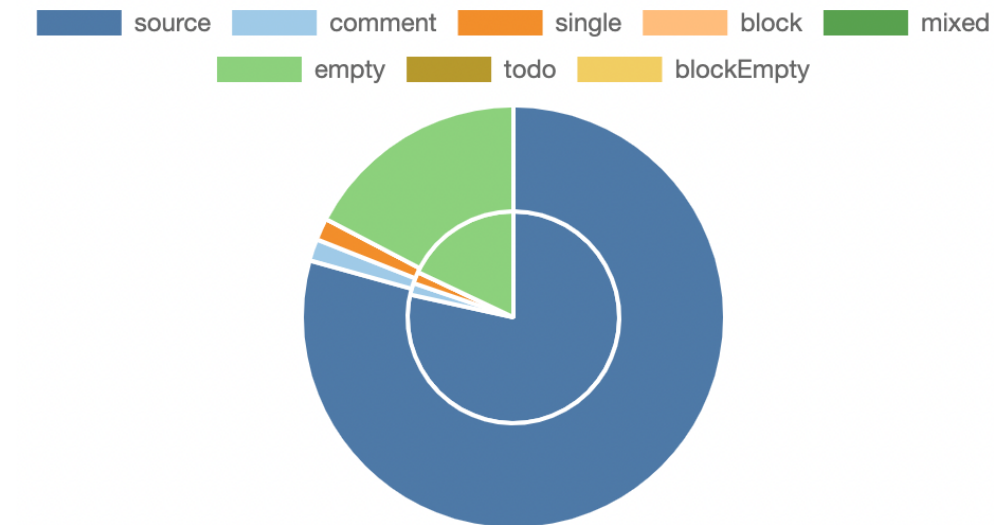
The following are the MD5 hashes of the reviewed files. A file with a different MD5 hash has been modified, intentionally or otherwise, after the security review. You are cautioned that a different MD5 hash could be (but is not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of the review

File	Fingerprint (MD5)
LPWrapper.sol	300b8674c4b765a639474f0e424fdc34












## 4.4 Metrics / CallGraph



## 4.5 Metrics / Source Lines & Risk





## 4.6 Metrics / Capabilities


<div>Solidity Versions observed</div> <div><input type="text" value="^0.5.0"/></div>	<div> Experimental Features</div> <div></div>	<div> Can Receive Funds</div> <div><input type="text"/></div>	<div> Uses Assembly</div> <div><input type="text"/></div>	<div> Has Destroyable Contracts</div> <div><input type="text" value="yes"/></div>	
<div> Transfers ETH</div> <div><input type="text" value="yes"/></div>	<div> Low-Level Calls</div> <div><input type="text"/></div>	<div> DelegateCall</div> <div><input type="text"/></div>	<div> Uses Hash Functions</div> <div><input type="text"/></div>	<div> ECRecover</div> <div><input type="text"/></div>	<div> New/Create/Create2</div> <div><input type="text"/></div>
<div> TryCatch</div>	<div>Σ Unchecked</div>				

### 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			
17	0			
External	Internal	Private	Pure	View
6	12	0	0	5

### StateVariables

<b>Total</b>	 <b>Public</b>
12	10

## 4.7 Metrics / Source Unites in Scope

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
	LPWrapper.sol	3	_____	176	164	131	3	125	
	<b>Totals</b>	<b>3</b>	_____	<b>176</b>	<b>164</b>	<b>131</b>	<b>3</b>	<b>125</b>	

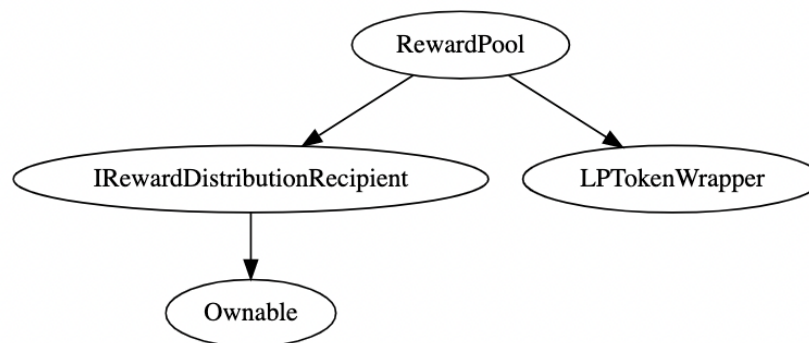
## 5. Scope of Work

The GAIA Everworld Team provided us with the files that needs to be tested. The scope of the audit is the LP Wrapper contract.

The team put forward the following assumptions regarding the security, usage of the contracts:

- The smart contract is coded according to the newest standards and in a secure way

The main goal of this audit was to verify these claims. The auditors can provide additional feedback on the code upon the client's request.



## 5.1 Manual and Automated Vulnerability Test

### CRITICAL ISSUES

During the audit, Chainsulting's experts found **no Critical issues** in the code of the smart contract.

### HIGH ISSUES

#### 5.1.1 Selfdestruct owner

Severity: HIGH

Status: ACKNOWLEDGED

File(s) affected: LPWrapper.sol

Attack / Description	Code Snippet	Result/Recommendation
Use of selfdestruct: Can block calling contracts unexpectedly. Be especially careful if this contract is planned to be used by other contracts (i.e. library contracts, interactions). Selfdestruction of the callee contract can leave callers in an inoperable state.	Line: 172 - 174 <pre>function destroyContract() external onlyOwner {     selfdestruct(msg.sender); }</pre>	The function destroyContract can be called only by the Owner, but once called destroys the contract and can cause problems for current staker. Consider removing that function or make sure the owner is controlled by a multisig, to prevent single point of failure such as hacks or phishing attacks.

### MEDIUM ISSUES

During the audit, Chainsulting's experts found **no Medium issues** in the code of the smart contract.

### LOW ISSUES

During the audit, Chainsulting's experts found **no Low issues** in the code of the smart contract.

## INFORMATIONAL ISSUES

### 5.1.2 Floating compiler versions

Severity: INFORMATIONAL

Status: ACKNOWLEDGED

Code: SWC-103

File(s) affected: ALL

Attack / Description	Code Snippet	Result/Recommendation
The current pragma solidity directive is floating. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.	<pre>pragma solidity ^0.5.0;</pre>	<p>It is recommended to follow the latter example, as future compiler versions may handle certain language constructions in a way the developer did not foresee. i.e. Pragma solidity 0.5.0</p> <p>See SWC-103: <a href="https://swcregistry.io/docs/SWC-103">https://swcregistry.io/docs/SWC-103</a></p>



## 5.2 SWC Attacks

ID	Title	Relationships	Test Result
<a href="#">SWC-131</a>	Presence of unused variables	<a href="#">CWE-1164: Irrelevant Code</a>	✓
<a href="#">SWC-130</a>	Right-To-Left-Override control character (U+202E)	<a href="#">CWE-451: User Interface (UI) Misrepresentation of Critical Information</a>	✓
<a href="#">SWC-129</a>	Typographical Error	<a href="#">CWE-480: Use of Incorrect Operator</a>	✓
<a href="#">SWC-128</a>	DoS With Block Gas Limit	<a href="#">CWE-400: Uncontrolled Resource Consumption</a>	✓
<a href="#">SWC-127</a>	Arbitrary Jump with Function Type Variable	<a href="#">CWE-695: Use of Low-Level Functionality</a>	✓
<a href="#">SWC-125</a>	Incorrect Inheritance Order	<a href="#">CWE-696: Incorrect Behavior Order</a>	✓
<a href="#">SWC-124</a>	Write to Arbitrary Storage Location	<a href="#">CWE-123: Write-what-where Condition</a>	✓
<a href="#">SWC-123</a>	Requirement Violation	<a href="#">CWE-573: Improper Following of Specification by Caller</a>	✓



ID	Title	Relationships	Test Result
<a href="#">SWC-122</a>	Lack of Proper Signature Verification	<a href="#">CWE-345: Insufficient Verification of Data Authenticity</a>	✓
<a href="#">SWC-121</a>	Missing Protection against Signature Replay Attacks	<a href="#">CWE-347: Improper Verification of Cryptographic Signature</a>	✓
<a href="#">SWC-120</a>	Weak Sources of Randomness from Chain Attributes	<a href="#">CWE-330: Use of Insufficiently Random Values</a>	✓
<a href="#">SWC-119</a>	Shadowing State Variables	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	✓
<a href="#">SWC-118</a>	Incorrect Constructor Name	<a href="#">CWE-665: Improper Initialization</a>	✓
<a href="#">SWC-117</a>	Signature Malleability	<a href="#">CWE-347: Improper Verification of Cryptographic Signature</a>	✓
<a href="#">SWC-116</a>	Timestamp Dependence	<a href="#">CWE-829: Inclusion of Functionality from Untrusted Control Sphere</a>	✓
<a href="#">SWC-115</a>	Authorization through tx.origin	<a href="#">CWE-477: Use of Obsolete Function</a>	✓
<a href="#">SWC-114</a>	Transaction Order Dependence	<a href="#">CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')</a>	✓

ID	Title	Relationships	Test Result
<a href="#">SWC-113</a>	DoS with Failed Call	<a href="#">CWE-703: Improper Check or Handling of Exceptional Conditions</a>	✓
<a href="#">SWC-112</a>	Delegatecall to Untrusted Callee	<a href="#">CWE-829: Inclusion of Functionality from Untrusted Control Sphere</a>	✓
<a href="#">SWC-111</a>	Use of Deprecated Solidity Functions	<a href="#">CWE-477: Use of Obsolete Function</a>	✓
<a href="#">SWC-110</a>	Assert Violation	<a href="#">CWE-670: Always-Incorrect Control Flow Implementation</a>	✓
<a href="#">SWC-109</a>	Uninitialized Storage Pointer	<a href="#">CWE-824: Access of Uninitialized Pointer</a>	✓
<a href="#">SWC-108</a>	State Variable Default Visibility	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	✓
<a href="#">SWC-107</a>	Reentrancy	<a href="#">CWE-841: Improper Enforcement of Behavioral Workflow</a>	✓
<a href="#">SWC-106</a>	Unprotected SELFDESTRUCT Instruction	<a href="#">CWE-284: Improper Access Control</a>	✓
<a href="#">SWC-105</a>	Unprotected Ether Withdrawal	<a href="#">CWE-284: Improper Access Control</a>	✓
<a href="#">SWC-104</a>	Unchecked Call Return Value	<a href="#">CWE-252: Unchecked Return Value</a>	✓

ID	Title	Relationships	Test Result
<a href="#">SWC-103</a>	Floating Pragma	<a href="#">CWE-664: Improper Control of a Resource Through its Lifetime</a>	X
<a href="#">SWC-102</a>	Outdated Compiler Version	<a href="#">CWE-937: Using Components with Known Vulnerabilities</a>	X
<a href="#">SWC-101</a>	Integer Overflow and Underflow	<a href="#">CWE-682: Incorrect Calculation</a>	
<a href="#">SWC-100</a>	Function Default Visibility	<a href="#">CWE-710: Improper Adherence to Coding Standards</a>	

## 6. Executive Summary

Two (2) independent Chainsulting experts performed an unbiased and isolated audit of the smart contract codebase. The final debriefs took place on the December 14, 2021.

The main goal of the audit was to verify the claims regarding the security of the smart contract. During the audit, no critical issues were found, after the manual and automated security testing and the claim have been successfully verified. Only the selfdestruct function can have an impact on the contract availability and can be further secured with a multisig.

## 7. Deployed Smart Contract

VERIFIED

GAIA X MATIC - <https://polygonscan.com/address/0xc746d3226af9ecb6b0eb80c1799e8bc22a1114e5#code>

GAIA X DAI - <https://polygonscan.com/address/0xaBE3AB72b608237d80bE59854bD9aD74c35F5b4F#code>

GAIA X BNB <https://bscscan.com/address/0xfbd25f0e7943f7b0d101e59e37337cdf37ec9676#code>

