

SMART CONTRACT SECURITY AUDIT OF DEVIL VAULT V2



SMART CONTRACT AUDIT | TEAM KYC | PROJECT EVALUATION

RELENTLESSLY SECURING THE PUBLIC BLOCKCHAIN | MADE IN CANADA 🛂

Summary

Auditing Firm InterFi Network

Architecture InterFi "Echelon" Auditing Standard

Smart Contract Audit Approved By Chris | Blockchain Specialist at InterFi Network

Platform Solidity

Audit Check (Mandatory) Static, Software, Auto Intelligent & Manual Analysis

Consultation Request Date November 30, 2021

Report Date December 02, 2021



<u>Audit Summary</u>

InterFi 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. According to the smart contract audit:

- Devil's Vault v2 contract source code has LOW RISK SEVERITY.
- ❖ Devil's Vault v2 contract has successfully PASSED the smart contract audit.
- This audit is for Devil's Vault v2 contract. If you're looking for token audit, please visit

https://qithub.com/interfinetwork/smart-contract-audits/blob/main/DevilToken_AuditReport_InterFi.pdf

For the detailed understanding of risk severity, source code vulnerability, and functional test, kindly refer to the audit. The Vault v2 contract isn't deployed on the blockchain at the time of the audit.



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Project Overview

InterFi was consulted by Devil on November 30, 2021 to conduct a smart contract security audit of their Vault v2 contract code.

About Devil's Vault v2

The Devil's Vault v2 is a single-staking dApp that allows holders of DEVL to stake their DEVL for their share of BUSD rewards and reflected DEVL rewards. The Vault is funded using the DEVL token's 3% tax dedicated to this feature. The smart contract is responsible for swapping the token's tax (sent as BNB) into BUSD and distributing the rewards using an amortization pattern.

Project Devil Vault v2

Blockchain Binance Smart Chain

Contract Not deployed

Dashboard https://devilorypto.app

Website https://www.devilorypto.io/

Telegram https://t.me/DevilTheCrypto

TikTok https://www.tiktok.com/@devilthecrypto

Twitter https://twitter.com/DevilTheCrypto



Public logo



Solidity Source Code On GitHub

//Private source code//



DevilVaultV2.sol

Audited at hash #4c8ef8a9780702c717c4cd1b8f7c19aed49c4b56



Audit Scope & Methodology

The scope of this report is to audit the smart contract source code of Devil's Vault v2 source code.

InterFi has scanned the contract and reviewed the project for common vulnerabilities, exploits, hacks, and back-doors. Below is the list of commonly known smart contract vulnerabilities, exploits, and hacks:

Category

- Re-entrancy (RE)
- Unhandled Exceptions (UE)
- Transaction Order Dependency (TO)
- Integer Overflow (IO)
- Unrestricted Action (UA)
- Ownership Takeover
- Gas Limit and Loops
- Deployment Consistency
- Repository Consistency
- Data Consistency
- Token Supply Manipulation
- Access Control and Authorization
- Operations Trail and Event Generation
- Assets Manipulation
- Liquidity Access

Smart Contract Vulnerabilities

Source Code Review

Functional Assessment



InterFi's Echelon Audit Standard

The aim of InterFi'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 ECHELON-1 to assess the smart contract:

- 1. Solidity smart contract source code reviewal:
 - Review of the specifications, sources, and instructions provided to InterFi to make sure we understand the size, scope, and functionality of the smart contract.
 - Manual review of code, which is the process of reading source code line-byline to identify potential vulnerabilities.
- 2. Static, Manual, and Automated Al analysis:
 - 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.
 - 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

- Slither
- Consensys MythX
- Consensys Surya
- Open Zeppelin Code Analyzer
- Solidity Code Complier



InterFi's Risk Classification

Smart contracts are generally designed to manipulate and hold funds denominated in ETH/BNB. 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.

-• •	SHIGH CONTROCT				
Risk severity	Meaning	Security Audit			
! Critical	This level vulne	rabilities could be exploited easily, and can lead to asset loss, data			
	loss, asset man	pulation, or data manipulation. They should be fixed right away.			
! High	This level vulne	rabilities 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 vulne	rabilities are should be fixed, as they carry an inherent risk of future			
	exploits, and ha	cks which may or may not impact the smart contract execution.			
! Low	This level vulne	erabilities can be ignored. They are code style violations, and			
	informational s	tatements 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
!	Important functionality

```
**Address** | Library | |||
 L | sendValue | Internal 🔓 | 🥮 | |
 L | functionCall | Internal 🗎 | 🛑
 👢 | functionCall | Internal 🛍 | 🥌
 └ | functionCallWithValue | Internal 🛍 |
 📙 | functionCallWithValue | Internal 🗎 | 🥌
 └ | functionStaticCall | Internal 🛍 |
 └ | functionStaticCall | Internal 🔓 |
 └ | functionDelegateCall | Internal 🔓 |
 👢 | functionDelegateCall | Internal 🗎 | 🧲
 L | _verifyCallResult | Private 🗳 | | |
 **Ownable** | Implementation | Context |||
 L | <Constructor> | Public ! | 🛑
 L | renounceOwnership | Public !
                                    | onlyOwner |
 L | transferOwnership | Public 🕴 | 🥌
                                  | onlyOwner |
**IERC20** | Interface | |||
 L | totalSupply | External 📒 |
 L | balanceOf | External ! |
 🏻 📙 | transfer | External 📜 | 🥮
 👢 | transferFrom | External 📒 | 🥮 |NO 🎚 |
 L | burn | External | | 🛑 | NO! |
 **SafeERC20** | Library | |||
 📙 | safeTransfer | Internal 🛍 | 🥌 | |
    safeTransferFrom | Internal ←
```



```
safeApprove | Internal 🗎 | 🥌
   | safeIncreaseAllowance | Internal 🛍 |
     callOptionalReturn | Private 🔐 | 🧓 | |
 **<mark>SafeMath</mark>** | Library |
    add | Internal 🖴 |
     sub | Internal 🔒
     sub | Internal 🖴
     mul | Internal 🖴
     div | Internal 🖴
           Internal 🔒
     div l
     mod | Internal 🖴
     mod | Internal 🗎
 **ReentrancyGuard** | Implementation | |||
   | <Constructor> | Public | | 🛑 |NO! |
1111111
 **IUniswapV2Router01** | Interface | |||
 L | factory | External | |
     WETH | External | |
                            |N0 |
     addLiquidity | External 📘 | 🥌
                                    👊 |N0 ! |
     addLiquidityETH | External | |
     removeLiquidity | External
                                         |N0 |
     removeLiquidityETH | External 📒 | 🥌
                                           |N0 |
     removeLiquidityWithPermit | External 👢 | 🛑
     removeLiquidityETHWithPermit | External
     swapExactTokensForTokens | External
                                                  |N0
     swapTokensForExactTokens | External
     swapExactETHForTokens | External
                                               IN0
     swapTokensForExactETH | External
     swapExactTokensForETH | External
                                               IN0
     swapETHForExactTokens | External | |
     quote | External | |
                             |NO | |
     getAmountOut | External | |
                                    |N0 |
     getAmountIn | External | |
                                   |NO | |
     getAmountsOut | External ! |
                                   |N0 |
     getAmountsIn | External | |
 **IUniswapV2Router02** | Interface | IUniswapV2Router01 |||
    removeLiquidityETHSupportingFeeOnTransferTokens | External 📒 | 🥌
     removeLiquidityETHWithPermitSupportingFeeOnTransferTokens | External 🕺 | 🔴
     swapExactTokensForTokensSupportingFeeOnTransferTokens | External ! | •
                                                                              |NO | |
     swapExactETHForTokensSupportingFeeOnTransferTokens | External 🖡 | 🝱 |NO
     swapExactTokensForETHSupportingFeeOnTransferTokens | External 📒 | 🥌
    <mark>DevilVaultV2</mark>** | Implementation | ReentrancyGuard, Ownable |||
     <Constructor> | Public ! | •
                                     |N0 |
     getTotalStaked | External ! |
     getUserStaked | External | |
                                     |NO |
     lastTimeRewardApplicable | Public | | |NO |
```



```
rewardPerTokenBusd | Public 🏮 |
   rewardPerTokenDevl | Public | | | NO | |
   earnedBusd | Public | |
                           |NO | |
   earnedDevl | Public | |
                           |NO |
  getRewardForDurationBusd | External ! | |NO! |
   getRewardForDurationDevl | External | | | NO! |
  getRewardTokenBusdBalance | External ! | |NO! |
   getReflectedRewardsBalance | External | | | NO | |
  getNumOfStakers | External ! | |NO! |
  getUserRewardsBUSD | External | | | NO! |
 | getUserRewardsDEVL | External | | | NO! |
📙 | stake | External 📒 | 🥌 | nonReentrant updateReward |
  withdraw | Public | | 🔵 | nonReentrant updateReward |
📙 | claim | Public 🕴 | 🥮 | nonReentrant updateReward |
  notifyRewardAmountBusd | Internal 🛍 | 🥮 | updateReward |
  notifyRewardAmountDevl | Internal 🔓 | 🥌 | updateReward |
  distributeRewards | Internal 🛍 | 🥮 | |
  callDistributeRewards | External 📒 | 🥮 | onlyOwner |
  recoverERC20 | External 📒 | 🥮 | onlyOwner |
   setRewardsDuration | External 「 | 🛑 | onlyOwner |
   <mark>emergencyPauseDeposits</mark> | External 🏮 | 🥌 | onlyOwner |
   emergencyPause5wap | External ! | 🛑 | onlyOwner |
   setMinNumTokensToDist | External 📒 | 🥮 | onlyOwner |
   <Receive Ether> | External | | MO | |
   vaultSwap | Public ! | 🙉 |NO !
   manualVaultSwap | External 📒 | 🥮
```

Security Audit



Smart Contract - Software Analysis

Function Signatures

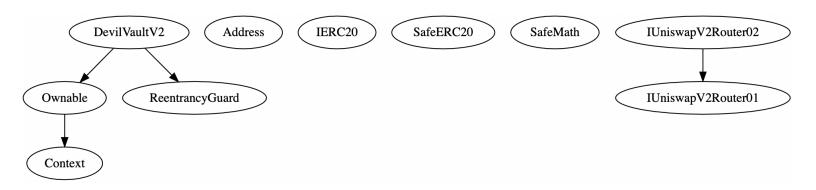
```
16279055 => isContract(address)
119df25f => msgSender()
8b49d47e \Rightarrow msqData()
24a084df => sendValue(address,uint256)
a0b5ffb0 => functionCall(address,bytes)
241b5886 => functionCall(address,bytes,string)
2a011594 => functionCallWithValue(address, bytes, uint256)
d525ab8a => functionCallWithValue(address,bytes,uint256,string)
c21d36f3 => functionStaticCall(address,bytes)
dbc40fb9 => functionStaticCall(address,bytes,string)
ee33b7e2 => functionDelegateCall(address,bytes)
57387df0 => functionDelegateCall(address,bytes,string)
18c2c6a2 => _verifyCallResult(bool,bytes,string)
8da5cb5b => owner()
715018a6 => renounceOwnership()
f2fde38b => transfer0wnership(address)
18160ddd => totalSupply()
70a08231 => balanceOf(address)
a9059cbb => transfer(address,uint256)
dd62ed3e => allowance(address,address)
095ea7b3 => approve(address,uint256)
23b872dd => transferFrom(address,address,uint256)
42966c68 => burn(uint256)
d0c407e1 => safeTransfer(IERC20,address,uint256)
5beae096 => safeTransferFrom(IERC20,address,address,uint256)
d6dcec8d => safeApprove(IERC20,address,uint256)
390cc046 => safeIncreaseAllowance(IERC20,address,uint256)
becc5a20 => _callOptionalReturn(IERC20,bytes)
771602f7 => add(uint256,uint256)
b67d77c5 => sub(uint256,uint256)
e31bdc0a => sub(uint256,uint256,string)
c8a4ac9c => mul(uint256,uint256)
a391c15b => div(uint256,uint256)
b745d336 => div(uint256,uint256,string)
f43f523a => mod(uint256,uint256)
71af23e8 => mod(uint256,uint256,string)
c45a0155 => factory()
ad5c4648 => WETH()
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)
             removeLiquidityETH(address, uint256, uint256, uint256, address, uint256)
02751cec =>
2195995c =>
removeLiquidityWithPermit(address,address,uint256,uint256,uint256,address,uint256,bool,uint8,bytes3
2.bvtes32)
```



```
ded9382a =>
removeLiquidityETHWithPermit(address,uint256,uint256,uint256,address,uint256,bool,uint8,bytes32,byt
es32)
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)
ad615dec => quote(uint256,uint256,uint256)
054d50d4 => getAmountOut(uint256,uint256,uint256)
85f8c259 => getAmountIn(uint256,uint256,uint256)
d06ca61f => getAmountsOut(uint256,address[])
1f00ca74 => getAmountsIn(uint256,address[])
af2979eb =>
removeLiquidityETHSupportingFeeOnTransferTokens(address,uint256,uint256,uint256,address,uint256)
5b0d5984 =>
removeLiquidityETHWithPermitSupportingFeeOnTransferTokens(address,uint256,uint256,uint256,address,u
int256,bool,uint8,bytes32,bytes32)
5c11d795 =>
swapExactTokensForTokensSupportingFeeOnTransferTokens(uint256,uint256,address[],address,uint256)
b6f9de95 => swapExactETHForTokensSupportingFeeOnTransferTokens(uint256,address[],address,uint256)
791ac947 =>
swapExactTokensForETHSupportingFeeOnTransferTokens(uint256,uint256,address[],address,uint256)
0917e776 => getTotalStaked()
dac3fc3f => getUserStaked(address)
80faa57d => lastTimeRewardApplicable()
c253933a => rewardPerTokenBusd()
af9cb7a9 => rewardPerTokenDevl()
c6ee2183 => earnedBusd(address)
30f26f79 => earnedDevl(address)
fd4c500c => getNumOfStakers()
723be903 => getAllocatedRewardDevl()
4fea3b2b => getUserRewardsBUSD(address)
c1f0531e => getUserRewardsDEVL(address)
b3a59022 => getLifetimeRewards()
a694fc3a => stake(uint256)
2e1a7d4d => withdraw(uint256)
4e71d92d => claim()
861317ed => notifyRewardAmountBusd(uint256)
fc66d8f7 => notifyRewardAmountDevl(uint256)
6f4a2cd0 => distributeRewards()
0055fe7e => callDistributeRewards()
8980f11f => recoverERC20(address,uint256)
cc1a378f => setRewardsDuration(uint256)
98181bc2 => emergencyPauseDeposits(bool)
d2b2f809 => emergencyPauseSwap(bool)
e450fa46 => setMinNumTokensToDist(uint256,uint256)
25a311e8 => vaultSwap()
5c521cbb => manualVaultSwap()
```



Inheritance Graph



Interfi

Smart Contract Security Audit



Smart Contract - Manual Analysis

Devil's Vault v2 smart contract has a low severity issue which may or may not create any functional vulnerability.

```
"resource": " / DevilVaultV2.sol",

"owner": "_generated_diagnostic_collection_name_#0",

"severity": 8, (! Low Severity)

"Expected pragma, import directive or contract/interface/library definition",

"source": "solc",
```

- When the smart contract has an active owner address, some of the smart contract functions can be edited, modified or altered.
- Devil's Vault v2 contract code is not deployed on any blockchain at the time of the audit. The contract code can be modified or altered after the audit is completed.
- Devil's Vault v2 contract utilizes "ReentrancyGuard" to prevent reentrant calls to a function. Reentrancy Guard is a contract module that helps prevent reentrant calls to a function. Inheriting from Reentrancy Guard will make the nonReentrant modifier available, which can be applied to functions to make sure there are no nested (reentrant) calls to them.



Smart Contract - SWC Attacks

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



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



Smart Contract - Risk Status & Radar Chart

Risk Severity Status ! Critical None critical severity issues identified ! High None high severity issues identified ! Medium None medium severity issues identified ! Low None low severity issues identified 27 functions and instances verified and passed **Passed** Score out of 100 Compiler Check 100 90 Interface Safety Static Analysis 80 Manual Analysis Software Analysis



Auditor's Verdict

InterFi 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.

Devil's Vault v2 contract source code has LOW RISK SEVERITY.

Devil's Vault v2 contract has successfully PASSED the smart contract audit.



Smart Contract
Security Audit



Important Disclaimer

InterFi Network 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 InterFi's prior written consent.

InterFi 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, InterFi 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 InterFi Network

InterFi Network provides intelligent blockchain solutions. InterFi is developing an ecosystem that is seamless and responsive. Some of our services: Blockchain Security, Token Launchpad, NFT Marketplace, etc. InterFi'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.

InterFi 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. InterFi 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://interfi.network

To view our audit portfolio, visit https://github.com/interfinetwork

To book an audit, message https://t.me/interfiaudits





