



Security Assessment TOP HYBRIUM EXCHANGE

Vital Block **Verified** on May 29th, 2023



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PREPARED FOR:
TOPHEX



INTRODUCTION

Auditing Firm	 VITAL BLOCK SECURITY
Client Firm	 TOP HYBRIUM EXCHANGE
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	TOKEN: 0x29fd481486af6765C95eA41e1466dee603b2EE37
Compiler Version	v0.8.18+commit.87f61d96
Contract Source Code	Solidity
Blockchain	COREDAO NETWORK
Centralization	Active ownership
Website	https://tophex.io/
Discord	https://discord.gg/Fcg5kvtjNY
Medium	https://tophybriumexchange.medium.com/
Twitter	https://twitter.com/TopHybriumEX
Docs	https://gitbook.tophex.io/
Telegram channel	https://t.me/thexglobalchannel
Prelim Report Date	MAY 29, 2023
Final Report Date	MAY 29 2023



Verify the authenticity of this report on our GitHub Repo: <https://www.github.com/vital-block>

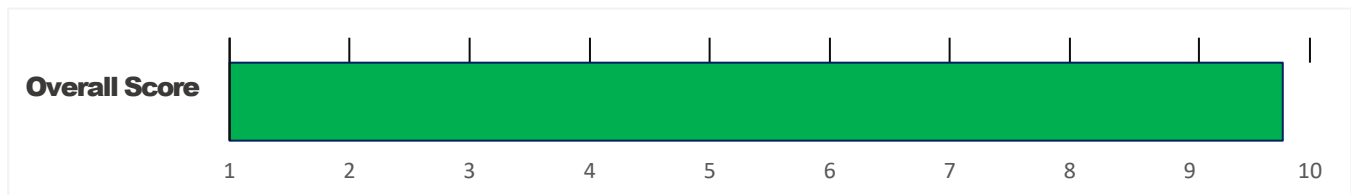


EXECUTIVE SUMMARY

TOP HYBRIUM EXCHANGE has performed the automated and manual analysis of the Sol code. The code was reviewed for common contract vulnerabilities and centralized exploits. Here's a quick audit summary:

Status	Critical ! 🔴	Major " 🟡	Medium # 🟡	Minor \$ 🟢	Unknown % 🟤
Open	0	0	1	2	0
Acknowledged	0	0	0	3	0
Resolved	0	0	0	0	0
Noteworthy onlyOwner Privileges	Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties, Set Reflector Settings, Set Swap Settings, Set Pair and Router				

TOPHEX Smart contract has achieved the following score: **98.0**



i Please note that smart contracts deployed on blockchains aren't resistant to exploits, vulnerabilities and/or hacks. Blockchain and cryptography assets utilize new and emerging technologies. These technologies present a high level of ongoing risks. For a detailed understanding of risk severity, source code vulnerability, and audit limitations, kindly review the audit report thoroughly.

i Please note that centralization privileges regardless of their inherited risk status - constitute an elevated impact on smart contract safety and security.



TABLE OF CONTENTS

TABLE OF CONTENTS	4
SCOPE OF WORK	5
AUDIT METHODOLOGY	6
RISK CATEGORIES	8
CENTRALIZED PRIVILEGES	9
AUTOMATED ANALYSIS	10
INHERITANCE GRAPH	15
MANUAL REVIEW	16
DISCLAIMERS	27
ABOUT VITALBLOCK	30



SCOPE OF WORK

Vital Block was consulted by **TOP HYBRIUM EXCHANGE** to conduct the smart contract audit of its. Sol source code. The audit scope of work is strictly limited to mentioned .SOL file only:

- **TOPHEX.Sol**

 **External contracts and/or interfaces dependencies are not checked due to being out of scope.**

Verify audited contract's contract address and deployed link below:

Public Contract Link

0x29fd481486af6765c95ea41e1466dee603b2ee37

Contract Name	Top Hybrium Exchange
Token Symbol	THEX
Decimals	18
Total Supply	100,000,000



AUDIT METHODOLOGY

Smart contract audits are conducted using a set of standards and procedures. Mutual collaboration is essential to performing an effective smart contract audit. Here's a brief overview of Vital Block auditing process and methodology:

CONNECT

- The onboarding team gathers source codes, and specifications to make sure we understand the size, and scope of the smart contract audit.

AUDIT

- Automated analysis is performed to identify common contract vulnerabilities. We may use the following third-party frameworks and dependencies to perform the automated analysis:
 - Remix IDE Developer Tool
 - Open Zeppelin Code Analyzer
 - SWC Vulnerabilities Registry
 - DEX Dependencies, e.g., Pancakeswap, Uniswap
- Simulations are performed to identify centralized exploits causing contract and/or trade locks.
- A manual line-by-line analysis is performed to identify contract issues and centralized privileges.

We may inspect below mentioned common contract vulnerabilities, and centralized exploits:

Centralized Exploits	<ul style="list-style-type: none">○ Token Supply Manipulation○ Access Control and Authorization○ Assets Manipulation○ Ownership Control○ Liquidity Access○ Stop and Pause Trading○ Ownable Library Verification
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Common Contract Vulnerabilities

- **Integer Overflow**
- **Lack of Arbitrary limits**
- **Incorrect Inheritance Order**
- **Typographical Errors**
- **Requirement Violation**
- **Gas Optimization**
- **Coding Style Violations**
- **Re-entrancy**
- **Third-Party Dependencies**
- **Potential Sandwich Attacks**
- **Irrelevant Codes**
- **Divide before multiply**
- **Conformance to Solidity Naming Guides**
- **Compiler Specific Warnings**
- **Language Specific Warnings**

REPORT

- **The auditing team provides a preliminary report specifying all the checks which have been performed and the findings thereof.**
- **The client's development team reviews the report and makes amendments to the codes.**
- **The auditing team provides the final comprehensive report with open and unresolved issues.**

PUBLISH

- **The client may use the audit report internally or disclose it publicly.**






 **It is important to note that there is no pass or fail in the audit, it is recommended to view the audit**

as an unbiased assessment of the safety of solidity codes.



RISK CATEGORIES

Smart contracts are generally designed to hold, approve, and transfer tokens. This makes them very tempting attack targets. A successful external attack may allow the external attacker to directly exploit. A successful centralization-related exploit may allow the privileged role to directly exploit. All risks which are identified in the audit report are categorized here for the reader to review:

Risk Type	Definition
Critical ! 	These risks could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
Major " 	These risks are hard to exploit but very important to fix, they carry an elevated risk of smart contract manipulation, which can lead to high-risk severity.
Medium # 	These risks should be fixed, as they carry an inherent risk of future exploits, and hacks which may or may not impact the smart contract execution. Low-risk re-entrancy-related vulnerabilities should be fixed to deter exploits.
Minor \$ 	These risks do not pose a considerable risk to the contract or those who interact with it. They are code-style violations and deviations from standard practices. They should be highlighted and fixed nonetheless.
Unknown % 	These risks pose uncertain severity to the contract or those who interact with it. They should be fixed immediately to mitigate the risk uncertainty.

All statuses which are identified in the audit report are categorized here for the reader to review:

Status Type	Definition
Open	Risks are open.
Acknowledged	Risks are acknowledged, but not fixed.
Resolved	Risks are acknowledged and fixed.



CENTRALIZED PRIVILEGES

Centralization risk is the most common cause of cryptography asset loss. When a smart contract has a privileged role, the risk related to centralization is elevated.

There are some well-intended reasons have privileged roles, such as:

- **Privileged roles can be granted the power to `pause()` the contract in case of an external attack.**
- **Privileged roles can use functions like, `include()`, and `exclude()` to add or remove wallets from fees, swap checks, and transaction limits. This is useful to run a presale and to list on an exchange.**


Authorizing privileged roles to externally-owned-account (EOA) is dangerous. Lately, centralization-related losses are increasing in frequency and magnitude.

- **The client can lower centralization-related risks by implementing below mentioned practices:**
- **Privileged role's private key must be carefully secured to avoid any potential hack.**
- **Privileged role should be shared by multi-signature (multi-sig) wallets.**
- **Authorized privilege can be locked in a contract, user voting, or community DAO can be introduced to unlock the privilege.**
- **Renouncing the contract ownership, and privileged roles.**
- **Remove functions with elevated centralization risk.**

 **Understand the project's initial asset distribution. Assets in the liquidity pair should be locked. Assets outside the liquidity pair should be locked with a release schedule.**



AUTOMATED ANALYSIS

Symbol	Definition
	Function modifies state
	Function is payable
	Function is internal
	Function is private
	Function is important

```

**TopHybriumExchange** | Interface | |||
| L | totalSupply | External | ! | NO |
| L | decimals | External | ! | NO |
| L | symbol | External | ! | NO |
| L | name | External | ! | NO |
| L | getOwner | External | NO |
| L | balanceOf | External | ! | NO |
| L | transfer | External | " ! ! | NO |
| L | allowance | External | ! | NO |
| L | approve | External | " ! ! | NO |
| L | transferFrom | External | " | NO |
|||||
**IFactoryV2** | Interface | |||
| L | getPair | External | NO | |
| L | createPair | External | " | NO |
|||||
**IV2Pair** | Interface | |||
| L | factory | External | NO | |
| L | getReserves | External | NO |
| L | sync | External | " | NO |

```



```
|||||
```

```
| **IRouter01** | Interface | |||
```

```
| L | factory | External ¶ | |NO¶|
```

```
| L | ETH | External ¶ | |NO¶|
```

```
| L | addLiquidityCORE | External ¶ | # |NO¶|
```

```
| L | addLiquidity | External ¶ | " |NO¶|
```

```
| L | swapExactCOREForTokens | External ¶ | # |NO¶|
```

```
| L | getAmountsOut | External ¶ | |NO¶|
```

```
| L | getAmountsIn | External ¶ | |NO¶|
```

```
|||||
```

```
| **IRouter02** | Interface | IRouter01 |||
```

```
| L | swapExactTokensForCORESupportingFeeOnTransferTokens | External ¶ | " |NO¶|
```

```
| L | swapExactCOREForTokensSupportingFeeOnTransferTokens | External ¶ | # |NO¶|
```

```
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External ¶ | " ! ● |NO¶|
```

```
| L | swapExactTokensForTokens | External ¶ | " |NO¶|
```

```
|||||
```

```
| **Protections** | Interface | |||
```

```
| L | checkUser | External ¶ | " ! ● |NO¶|
```

```
| L | setLaunch | External ¶ | " |NO¶|
```

```
| L | setLpPair | External ¶ | " |NO¶|
```

```
| L | THEX | External ¶ | " |NO¶|
```

```
| L | removeSniper | External ¶ | " |NO¶|
```

```
|||||
```

```
| **Cashier** | Interface | |||
```

```
| L | setRewardsProperties | External ¶ | " |NO¶|
```

```
| L | tally | External ¶ | " |NO¶|
```

```
| L | load | External ¶ | # |NO¶|
```

```
| L | cashout | External ¶ | " |NO¶|
```

```
| L | giveMeWelfarePlease | External ¶ | " |NO¶|
```

```
| L | getTotalDistributed | External ¶ | |NO¶|
```

```
| L | getUserInfo | External ¶ | |NO¶|
```

```
| L | getUserRealizedRewards | External ¶ | |NO¶|
```



```

| L | getPendingRewards | External ¶ | | | NO ¶ |
| L | initialize | External ¶ | " | | NO ¶ |
| L | getCurrentReward | External ¶ | | | NO ¶ |
|||||
| **CORE** | Implementation | SafeMath |||
| L | <Constructor> | Public ¶ | | # | NO ¶ |
| L | transferOwner | External ¶ | " | | onlyOwner |
| L | renounceOwnership | External ¶ | " | | NO ¶ |
| L | setOperator | Public ¶ | " | | NO ¶ |
| L | renounceOriginalDeployer | External ¶ | " | | NO ¶ |
| L | <Receive Ether> | External ¶ | | # | NO ¶ |
| L | totalSupply | External ¶ | | | NO ¶ |
| L | decimals | External ¶ | | | NO ¶ |
| L | symbol | External ¶ | | | NO ¶ |
| L | name | External ¶ | | | NO ¶ |
| L | getOwner | External ¶ | | ! | NO ¶ |
| L | balanceOf | Public ¶ | | ! | NO ¶ |
| L | allowance | External ¶ | | ! | NO ¶ |
| L | approve | External ¶ | " | ! ● | NO ¶ |
| L | _approve | Internal $ | " | | |
| L | approveContractContingency | Public ¶ | " | ! ● | onlyOwner |
| L | transfer | External ¶ | " | | NO ¶ |
| L | transferFrom | External ¶ | " | | NO ¶ |
| L | setNewRouter | External ¶ | " | | onlyOwner |
| L | setLpPair | External ¶ | " | | onlyOwner |
| L | setInitializers | External ¶ | " | | onlyOwner |
| L | isExcludedFromFees | External ¶ | | | NO ¶ |
| L | isExcludedFromDividends | External ¶ | | | NO ¶ |
| L | isExcludedFromProtection | External ¶ | | | NO ¶ |
| L | setDividendExcluded | Public ¶ | " | | onlyOwner |
| L | setExcludedFromFees | Public ¶ | " | | onlyOwner |

```



THEX-02 POSSIBLE OVERFLOW

Category	Severity ●	Location	Status
Mathematical Operations	Minor	contracts/base/code/Tophex.sol	Acknowledged

Description

In `updateForMinter`, the following equation is used inside an unchecked block

```
function _mint(address account, uint256 amount) internal virtual {  
    require(account != address(0), "ERC20: mint to the zero address");  
  
    _beforeTokenTransfer(address(0), account, amount);  
}
```






Minter can not issue more `THEX` tokens indefinitely.

Note that as of the date of publishing, the above review reflects the current understanding of known security patterns as they relate to the THEX contract.

Recommendation

We recommend either checking for overflow in this case, or ensuring that the `PairsIn` is close enough it will never cause an overflow.

OPTIMIZATIONS | Top Hybrium Exchange

ID	Title	Category	Status
EMT-0988	Logarithm Refinement Optimization	Gas Optimization	Acknowledged 
EMT-679	Checks Can Be Performed Earlier	Gas Optimization	Acknowledged 
EMT-0056	Unnecessary Use Of SafeMath	Gas Optimization	Acknowledged 
EMT-4301	Struct Optimization	Gas Optimization	Acknowledged 
EMT-3652	Unused State Variable	Gas Optimization	Acknowledged 

General Detectors



Missing Zero Address Validation

Some functions in this contract may not appropriately check for zero addresses being used.



Attention
Required



Numeric Notation Best Practices

The numeric notation used in this contract is unconventional, possibly worsening the reading/debugging experience.



Attention
Required

- | | |
|--|--|
| ✓ No compiler version inconsistencies found | ✓ No tautologies or contradictions found |
| ✓ No unchecked call responses found | ✓ No faulty true/false values found |
| ✓ No vulnerable self-destruct functions found | ✓ No inaccurate divisions found |
| ✓ No assertion vulnerabilities found | ✓ No redundant constructor calls found |
| ✓ No old solidity code found | ✓ No vulnerable transfers found |
| ✓ No external delegated calls found | ✓ No vulnerable return values found |
| ✓ No external call dependency found | ✓ No uninitialized local variables found |
| ✓ No vulnerable authentication calls found | ✓ No default function responses found |
| ✓ No invalid character typos found | ✓ No missing arithmetic events found |
| ✓ No RTL characters found | ✓ No missing access control events found |
| ✓ No dead code found | ✓ No redundant true/false comparisons found |
| ✓ No risky data allocation found | ✓ No state variables vulnerable through function calls found |
| ✓ No uninitialized state variables found | ✓ No buggy low-level calls found |
| ✓ No uninitialized storage variables found | ✓ No expensive loops found |
| ✓ No vulnerable initialization functions found | ✓ No bad numeric notation practices found |
| ✓ No risky data handling found | ✓ No missing constant declarations found |
| ✓ No number accuracy bug found | ✓ No missing external function declarations found |
| ✓ No out-of-range number vulnerability found | ✓ No vulnerable payable functions found |
| ✓ No map data deletion vulnerabilities found | ✓ No vulnerable message values found |



Vulnerability Scan

REENTRANCY

✓ No reentrancy risk found

Severity Minor

Confidence Parameter Certain

✓ **Not Mintable:** The contract Does not contain additional issuance functions, which could maybe generate a large number of tokens, resulting in significant fluctuations in token prices. It is recommended to confirm with the project team whether it complies with the token issuance instructions.

Vulnerability Description

Scanning Line:

```
function changeGov3Wallet(address _gov3Address) external {
    require(_msgSender() == gov3Address, "Only gov3Address Wallet!");
    require(_gov3Address != address(0), "0x is not accepted here");

    gov3Address = _gov3Address;
}

function isPair(address account) public view returns (bool) {
    return _pairs.contains(account);
}

function addPair(address pair) public onlyOwner returns (bool) {
    require(pair != address(0), "THEX: pair is the zero address");
    return _pairs.add(pair);
}

function delPair(address pair) public onlyOwner returns (bool) {
    require(pair != address(0), "THEX: pair is the zero address");
    return _pairs.remove(pair);
}

function getInterLength() public view returns (uint256) {
    return _pairs.length();
}

function getPair(uint256 index) public view returns (address) {
    require(index <= _pairs.length() - 1, "THEX: index out of bounds");
    return _pairs.at(index);
}

// receive eth
receive() external payable {}
```


Identifier	Definition	Severity
THEX-03	Initial asset distribution	Minor 

All of the initially minted assets are sent to the contract deployer when deploying the contract. This can be an issue as the deployer and/or contract owner can distribute tokens without consulting the community.

```
describe("Storage", function () {
  it("test initial value", async function () {
    const Storage = await ethers.getContractFactory("Storage");
    const storage = await Storage.deploy();
    await storage.deployed();
    console.log('storage deployed at:' + storage.address)
    expect((await storage.retrieve()).toNumber()).to.equal(0);
  });
});
```

RECOMMENDATION

Project stakeholders should be consulted during the initial asset distribution process.



Repository:

<https://github.com/TOPHEX>

All Audited Files

TopHEX.sol

Contract Creator

0x9e627490ea7ecd2307a43e1c47729ebb15c8870f

Creator Txn Hash

0x7edaaebe89a020c4bcee570693d9705f69b5a1da4347a88295c733590f550368

Contracts:

Contract:

TOKEN: 0x29fd481486af6765c95ea41e1466dee603b2ee37



Vulnerability Run check

Risk Analysis

✔ Contract source code verified

This token contract is open source. You can check the contract code for details. Unsourced token contracts are likely to have malicious functions to defraud their users of their assets.

✔ No mint function

Mint function is transparent or non-existent. Hidden mint functions may increase the amount of tokens in circulation and effect the price of the token.

✔ Owner cant change balance

The contract owner does not have the authority to modify the balance of tokens at other addresses.

✔ No Proxy

There is no proxy in the contract. The proxy contract means contract owner can modify the function of the token and possibly effect the price.

✔ No function to retrieve ownership

If this function exists, it is possible for the project owner to regain ownership even after relinquishing it.



Honeypot Risk

✔ This does not appear to be a honeypot

We are not aware of any code that prevents the sale of tokens.

✔ No Anti Whale

There is no limit to the number of token transactions. The number of scam token transactions may be limited (honeypot risk).

✔ No whitelist function

Whitelist function found

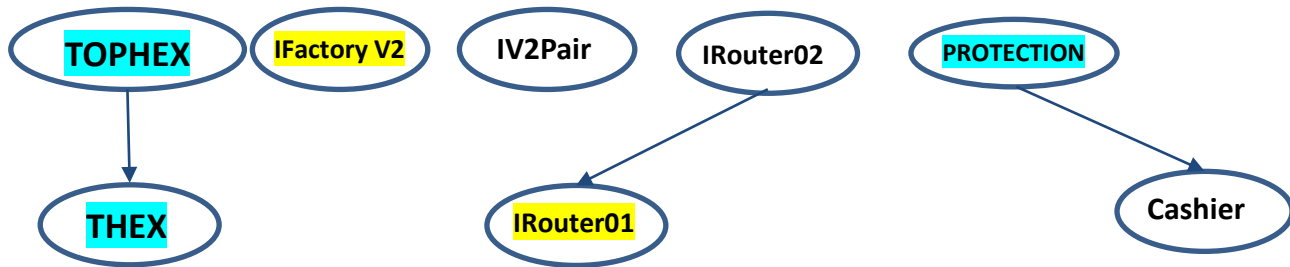
✔ No trading cooldown

The token contract has no trading cooldown function. If there is a trading cooldown function, the user will not be able to sell the token within a certain time or block after buying.

✔ No blacklist function

No blacklist function is included.

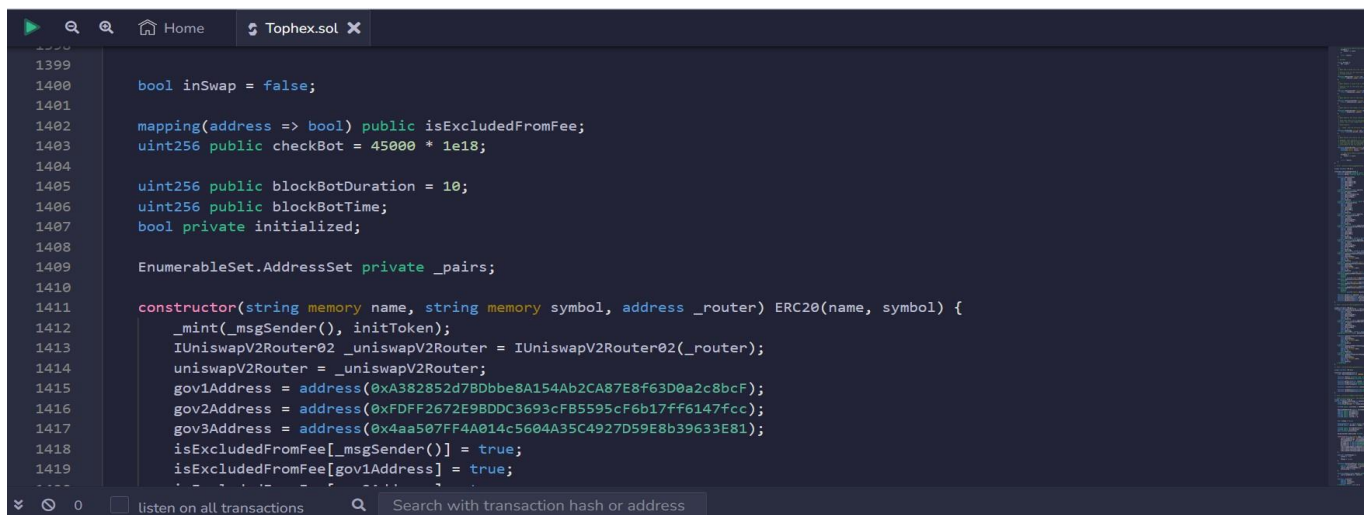
INHERITANCE GRAPH



Identifier	Definition	Severity
CEN-12	Centralization privileges of Top Hybrium Exchange	Medium ■

Vulnerability 0 : No important security issue detected.

Threat level: Low



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MANUAL REVIEW

EVAMETA: Top Hybrium Exchange (THEX) is a cutting-edge platform on CoreDAO that has been designed to provide its users with unparalleled levels of liquidity, security, privacy and anonymity. Unlike other exchanges, we have combined the advantages of both centralized exchanges (CEXs) and decentralized exchanges (DEXs) to create the most flexible one - the Hybrid Exchange.

TOKEN NAME: Top Hybrium Exchange

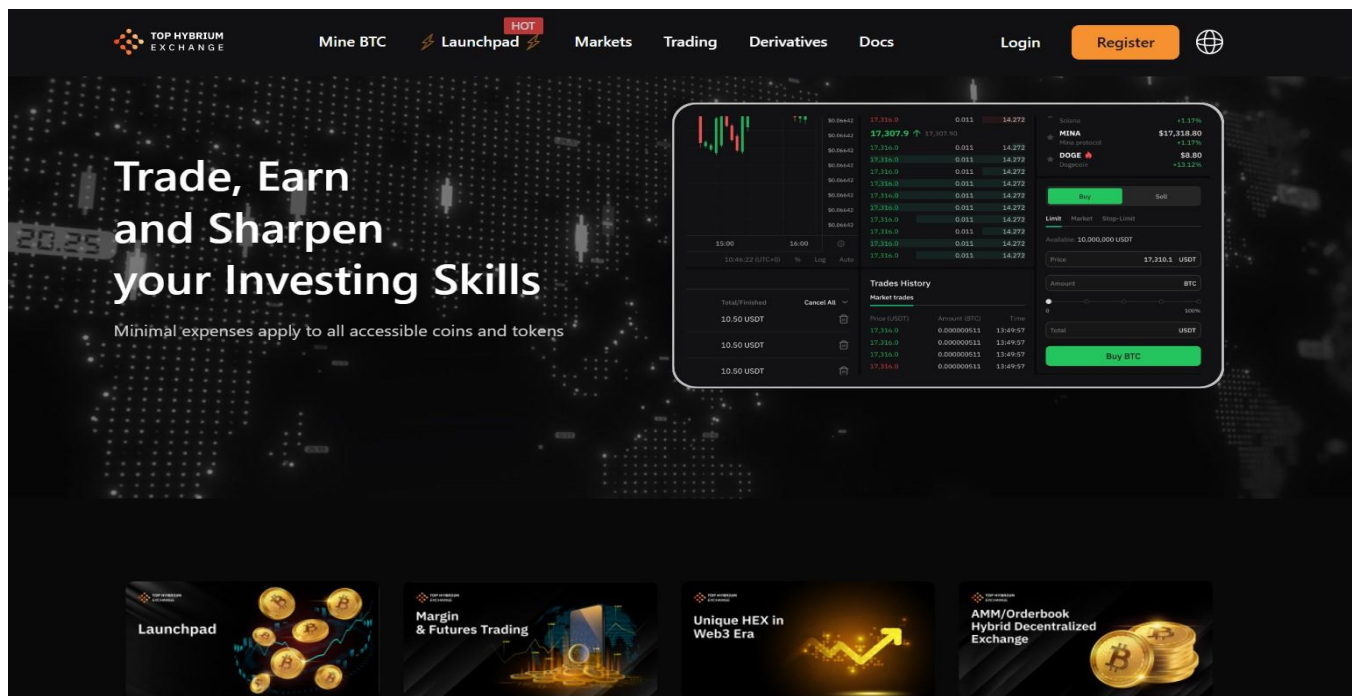
Ticker: THEX

Chain/Standard: CORE BLOCKCHAIN

Total Supply: 100,000,000



The Top Hybrium Exchange Platform Is Launched On CORE CHAIN





ISSUES CHECKING STATUS

Issue Description

Checking Status

1.	Compiler errors.	PASSED
2.	Race Conditions and reentrancy. Cross-Function Race Conditions.	PASSED
3.	Possible Delay In Data Delivery.	PASSED
4.	Oracle calls.	PASSED
5.	Front Running.	PASSED
6.	Sol Dependency.	PASSED
7.	Integer Overflow And Underflow.	PASSED
8.	DoS with Revert.	PASSED
9.	Dos With Block Gas Limit.	PASSED
10.	Methods execution permissions.	PASSED
11.	Economy Model of the contract.	PASSED
12.	The Impact Of Exchange Rate On the solidity Logic.	PASSED
13.	Private use data leaks.	PASSED
14.	Malicious Event log.	PASSED
15.	Scoping and Declarations.	PASSED
16.	Uninitialized storage pointers.	PASSED
17.	Arithmetic accuracy.	PASSED
18.	Design Logic.	PASSED
19.	Cross-Function race Conditions	PASSED
20.	Save Upon solidity contract Implementation and Usage.	PASSED
21.	Fallback Function Security	PASSED



AUDIT RESULT

PASSED

SMART CONTRACT AUDIT OF TOPHEX

RECOMMENDATION

Deployer and/or contract owner private keys are secured carefully.

Please refer to PAGE-09 CENTRALIZED PRIVILEGES for a detailed understanding.

ALLEVIATION

The Top Hybrium Exchange project team understands the centralization risk. Some functions are provided privileged access to ensure a good runtime behavior in the project



Identifier	Definition	Severity
COD-10	Third Party Dependencies	Minor 

Smart contract is interacting with third party protocols e.g., Pancakeswap router, cashier contract, protections contract. The scope of the audit treats third party entities as black boxes and assumes their functional correctness. However, in the real world, third parties can be compromised, and exploited. Moreover, upgrades in third parties can create severe impacts, e.g., increased transactional fees, deprecation of previous routers, etc.

RECOMMENDATION

Inspect and validate third party dependencies regularly, and mitigate severe impacts whenever necessary.



CERTIFICATE BY VITAL BLOCK SECURITY



DISCLAIMERS

Vital Block provides the easy-to-understand audit of Solidity, Move and Raw source codes (commonly known as smart contracts).

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ABOUT VITAL BLOCK

Vital Block provides intelligent blockchain Security Solutions. We provide solidity and Raw Code Review, testing, and auditing services. We have Partnered with 15+ Crypto Launchpads, audited 50+ smart contracts, and analyzed 200,000+ code lines. We have worked on major public blockchains e.g., Ethereum, Binance, Cronos, Doge, Polygon, Avalanche, Metis, Fantom, Bitcoin Cash, Aptos, Oasis, etc.

Vital Block is Dedicated to Making Defi & Web3 A Safer Place. We are Powered by Security engineers, developers, UI experts, and blockchain enthusiasts. Our team currently consists of 5 core members, and 4+ casual contributors.

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