ASTROBIATECH
BLOCKCHAIN SECURITY

MADE IN INDIA
BLOCKCHAIN SECURITY

SECURITY ASSESSMENT REPORT

PREPARED FOR

_patrickStaking

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SCOPE OF AUDIT

The scope of this audit was to analyze and document the _patrickStaking smart contract codebase for quality, security, and correctness.

CHECKED VULNERABILITIES

We have scanned the smart contract for commonly known and morespecific vulnerabilities. Here are some of the commonly known vulnerabilities that we considered:

- Re-entrancy
- Timestamp Dependence
- Gas Limit and Loops
- DoS with Block Gas Limit
- Transaction-Ordering Dependence
- Use of tx.origin
- Exception disorder
- Gasless send
- Balance equality
- Byte array
- Transfer forwards all gas
- ERC20 API violation
- Malicious libraries
- Compiler version not fixed
- Redundant fallback function
- Send instead of transfer
- Style guide violation
- Unchecked external call
- Unchecked math
- Unsafe type inference
- Implicit visibility level

TECHNIQUES & METHODS

Throughout the audit of smart contract, care was taken to ensure:

- The overall quality of code.
- Use of best practices.
- Code documentation and comments match logic and expected behaviour.
- Token distribution and calculations are as per the intended behaviour mentioned in the whitepaper.
- Implementation of ERC-20 token standards.
- Efficient use of gas.
- Code is safe from re-entrancy and other vulnerabilities.

The following techniques, methods and tools were used to review all thesmart contracts.

Static Analysis

Static Analysis of Smart Contracts was done to identify contract vulnerabilities. In this step a series of automated tools are used to testsecurity of smart contracts.

Code Review / Manual Analysis

Manual Analysis or review of code was done to identify new vulnerability or verify the vulnerabilities found during the static analysis.Contracts were completely manually analyzed, their logic was checkedand compared with the one described in the whitepaper. Besides, the results of automated analysis were manually verified.

ISSUE CATEGORIES

Every issue in this report has been assigned with a severity level. There are four levels of severity and each of them has been explained below.

➢ HIGH SEVERITY ISSUES

A high severity issue or vulnerability means that your smart contract can be exploited. Issues on this level are critical to the smart contract's performance or functionality and we recommend these issues to be fixed before movingto a live environment.

➢ MEDIUM SEVERITY ISSUES

The issues marked as medium severity usually arise because of errors and deficiencies in the smart contract code. Issues on this level could potentially bring problems and they should still be fixed.

➢ LOW SEVERITY ISSUES

Low level severity issues can cause minor impact and or are just warningsthat can remain unfixed for now. It would be better to fix these issues atsome point in the future.

➢ INFORMATIONAL

These are severity four issues which indicate an improvement request, ageneral question, a cosmetic or documentation error, or a request for information. There is low-to-no impact.

ISSUES TABLE

TYPE	HIGH	MEDIUM	LOW	INFORMATIONAL
OPEN	1	0	1	0
ACKNOWLWDGENT	-	-	-	-
CLOSED	-	-	-	-

INTRODUCTION

On 01-11-2023 – Astrobiatech Blockchain Security Team performed security audit for _patrickStaking smart contract.

CONTRACT NAME	_patrickStaking
CONTRACT ADDRESS	0x5be6e83bf88c3731d61bb049a4f771fe31970e81
BLOCKCHAIN	Ethereum

OVERVIEW

CONTRACT ADDRESS
0x5be6e83bf88c3731d61bb049a4f771fe31970e81

CONTRACT NAME
_patrickStaking

CONTRACT CREATOR
0x2a08C7DEdcB187aD0E36F5D5cC397aDf65c0EeF1

OWNER ADDRESS
0x2a08C7DEdcB187aD0E36F5D5cC397aDf65c0EeF1

SOURCE CODE
Contract Source Code Verified at Ethereum Mainnet

OTHER SETTINGS
default evmVersion, MIT license

COMPILER VERSION
v0.8.17+commit.8df45f5f

OPTIMIZATION ENABLED
No with 200 runs

Code is truncated to fit the constraints of this document.
https://etherscan.io/address/0x5be6e83bf88c3731d61bb049a4f771fe31970e81#code

MANUAL ANALYSIS FINDINGS

HIGH

1. Minimum Stake Amount Check

Description:-

The minimum stake amount is hard-coded, making it inflexible and potentially requiring contract redeployment if the value needs to change.

Code:-

```
require(_amount >= 80000000000000000000000000,
"Amount must be greater than or equal to the minimum stake amount");
```

Recommendation:-

Make the minimum stake amount a configurable parameter or governable variable. This allows the contract owner or governance to adjust the minimum stake amount without redeploying the contract, which is more flexible.

LOW

2. Total Users Count

Description:-

The getTotalUsers function returns the length of the totalusers array, which may not provide significant value since the array is public. It might be better to remove this function.

Code:-

```
function getTotalUsers() public view returns (uint256) {
    return totalusers.length;
}
```

Recommendation:-

It might be better to remove this function to avoid exposing this specific data unnecessarily.

AUTOMATED ANALYSIS

```
INFO:Detectors:
 _patrickStaking.stake(uint256) (token.sol#64-79) ignores return value by
token.transferFrom(msg.sender,address(this),_amount) (token.sol#74)
_patrickStaking.unstake(uint256) (token.sol#82-100) ignores return value by
token.transfer(msg.sender,_amount) (token.sol#97)
_patrickStaking.claimRewards() (token.sol#102-120) ignores return value by token.transfer(msg.sender,reward
+ users[msg.sender].accumulutedreward) (token.sol#113-116)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#unchecked-transfer

INFO:Detectors:
Reentrancy in _patrickStaking.claimRewards() (token.sol#102-120):
        External calls:
        - token.transfer(msg.sender,reward + users[msg.sender].accumulutedreward) (token.sol#113-116)
        State variables written after the call(s):
        - users[msg.sender].accumulutedreward = 0 (token.sol#117)
        _patrickStaking.users (token.sol#26) can be used in cross function reentrancies:
        - _patrickStaking.claimRewards() (token.sol#102-120)
        - _patrickStaking.getReward(address) (token.sol#146-151)
        - _patrickStaking.getStakedAmount(address) (token.sol#124-126)
        - _patrickStaking.getTimeRemainingForUnstake(address) (token.sol#132-144)
        - _patrickStaking.stake(uint256) (token.sol#64-79)
        - _patrickStaking.unstake(uint256) (token.sol#82-100)
        - _patrickStaking.users (token.sol#26)
        - users[msg.sender].lastClaimTimestamp = block.timestamp (token.sol#118)
        _patrickStaking.users (token.sol#26) can be used in cross function reentrancies:
        - _patrickStaking.claimRewards() (token.sol#102-120)
        - _patrickStaking.getReward(address) (token.sol#146-151)
        - _patrickStaking.getStakedAmount(address) (token.sol#124-126)
        - _patrickStaking.getTimeRemainingForUnstake(address) (token.sol#132-144)
        - _patrickStaking.stake(uint256) (token.sol#64-79)
        - _patrickStaking.unstake(uint256) (token.sol#82-100)
        - _patrickStaking.users (token.sol#26)
Reentrancy in _patrickStaking.stake(uint256) (token.sol#64-79):
        External calls:
        - token.transferFrom(msg.sender,address(this),_amount) (token.sol#74)
        State variables written after the call(s):
        - users[msg.sender].startTime = block.timestamp (token.sol#76)
        _patrickStaking.users (token.sol#26) can be used in cross function reentrancies:
        - _patrickStaking.claimRewards() (token.sol#102-120)
        - _patrickStaking.getReward(address) (token.sol#146-151)
        - _patrickStaking.getStakedAmount(address) (token.sol#124-126)
        - _patrickStaking.getTimeRemainingForUnstake(address) (token.sol#132-144)
        - _patrickStaking.stake(uint256) (token.sol#64-79)
        - _patrickStaking.unstake(uint256) (token.sol#82-100)
        - _patrickStaking.users (token.sol#26)
        - users[msg.sender].stakedAmount += _amount (token.sol#77)
        _patrickStaking.users (token.sol#26) can be used in cross function reentrancies:
        - _patrickStaking.claimRewards() (token.sol#102-120)
        - _patrickStaking.getReward(address) (token.sol#146-151)
        - _patrickStaking.getStakedAmount(address) (token.sol#124-126)
        - _patrickStaking.getTimeRemainingForUnstake(address) (token.sol#132-144)
        - _patrickStaking.stake(uint256) (token.sol#64-79)
        - _patrickStaking.unstake(uint256) (token.sol#82-100)
        - _patrickStaking.users (token.sol#26)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-1
```

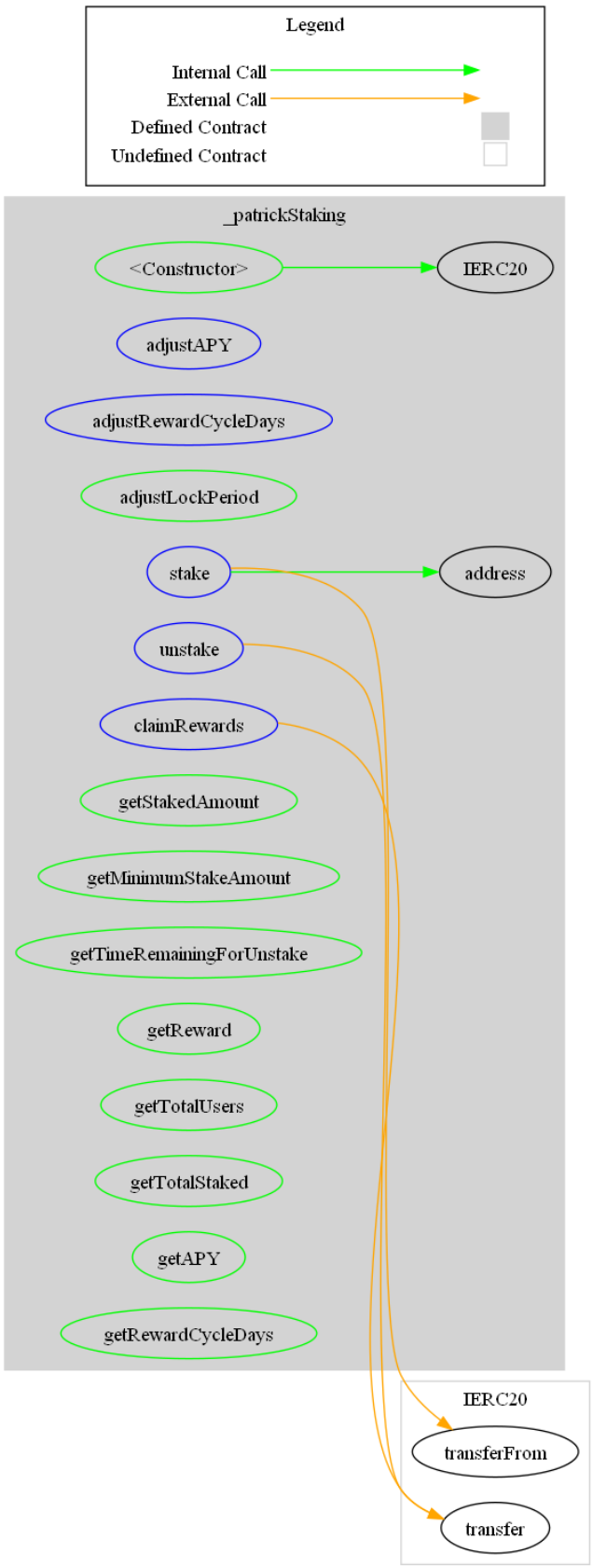
FUNCTIONAL ANALYSIS

Contract	Type	Bases		
└	**Function Name**	**Visibility**	**Mutability**	**Modifiers**
_patrickStaking	Implementation	Ownable		
└	<Constructor>	Public !	🔴	NO !
└	adjustAPY	External !	🔴	onlyOwner
└	adjustRewardCycleDays	External !	🔴	onlyOwner
└	adjustLockPeriod	Public !	🔴	NO !
└	stake	External !	🔴	NO !
└	unstake	External !	🔴	NO !
└	claimRewards	External !	🔴	NO !
└	getStakedAmount	Public !		NO !
└	getMinimumStakeAmount	Public !		NO !
└	getTimeRemainingForUnstake	Public !		NO !
└	getReward	Public !		NO !
└	getTotalUsers	Public !		NO !
└	getTotalStaked	Public !		NO !
└	getAPY	Public !		NO !
└	getRewardCycleDays	Public !		NO !

Legend

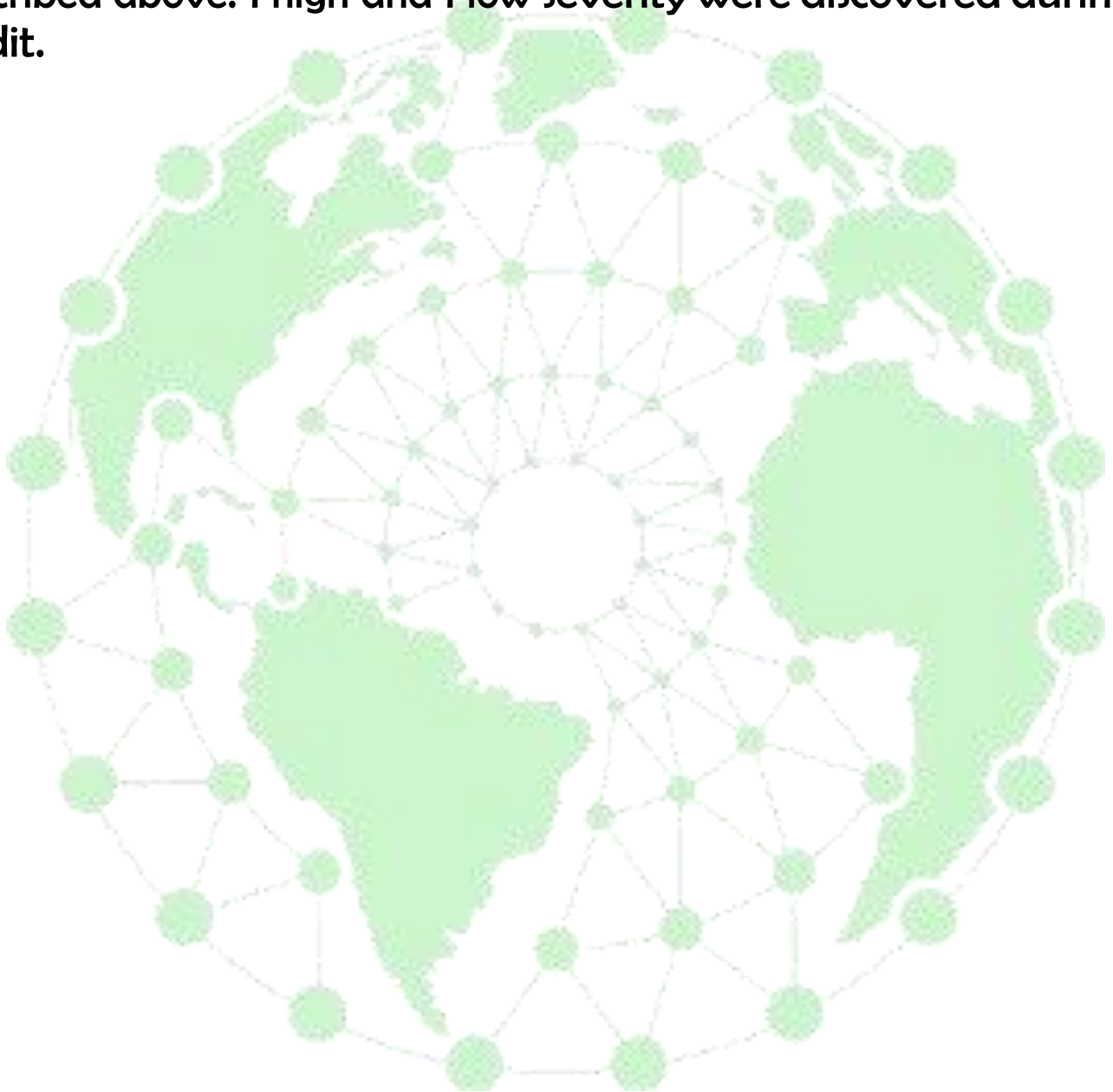
Symbol	Meaning
🔴	Function can modify state
💵	Function is payable

GRAPH TREE


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
_patrickStaking
<Constructor>
IERC20
adjustAPY
adjustRewardCycleDays
adjustLockPeriod
stake
address
unstake
claimRewards
getStakedAmount
getMinimumStakeAmount
getTimeRemainingForUnstake
getReward
getTotalUsers
getTotalStaked
getAPY
getRewardCycleDays
IERC20
transferFrom
transfer

SUMMARY

In this report, we have considered the security of the _patrickStaking smart contract. We performed our audit according to the procedure described above. 1 high and 1 low severity were discovered during the audit.



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