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AUDIT COMPANY

Smart Contract Security Audit

TechRate

November, 2021

Audit Details



Audited project

BAD APES



Deployer address

0x153B202F6C6e570f13C27371CdA6Ae2c8768Dca6



Client contacts:

BAD APES team



Blockchain

Binance Smart Chain



Project website:

<https://badapes.co/>

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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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.

Background

TechRate was commissioned by BAD APES to perform an audit of smart contracts:

<https://bscscan.com/address/0xc4f5424ef52499fa496a07f3fe9daab88553d4c3#code>

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Contracts Details

Token contract details for 13.11.2021

Contract name	BAD APES
Contract address	0xC4F5424eF52499fa496a07f3fE9DaAb88553D4C3
Total supply	99,995,464,602,401,600.206398
Token ticker	BAYC
Decimals	18
Token holders	128
Transactions count	730
Top 100 holders dominance	100.00%
Tax fee	200
Burn fee	100
Charity fee	0
Total fees	9,070,795,196,817.587203221395855842
Contract deployer address	0x153B202F6C6e570f13C27371CdA6Ae2c8768Dca6
Contract's current owner address	0xB6705FAc676956aB1A60c1c84A73c154dB2a4d93

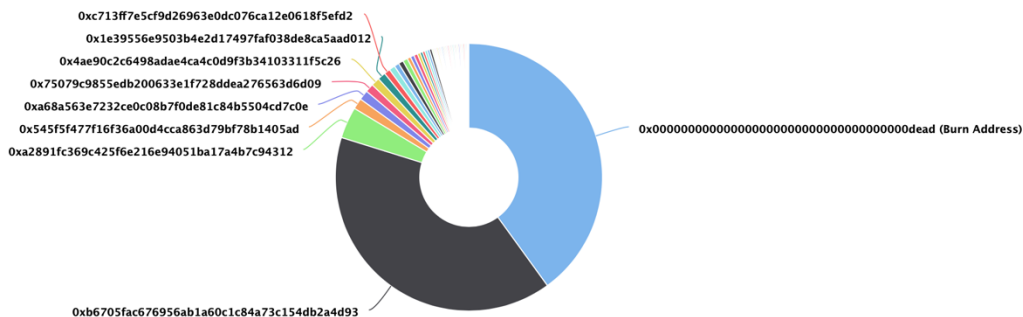
BAD APES Token Distribution

The top 100 holders collectively own 100.00% (99,994,900,444,672,200.00 Tokens) of BAD APES

Token Total Supply: 99,995,464,602,401,600.21 Token | Total Token Holders: 128

BAD APES Top 100 Token Holders

Source: BscScan.com



(A total of 99,994,900,444,672,200.00 tokens held by the top 100 accounts from the total supply of 99,995,464,602,401,600.21 token)

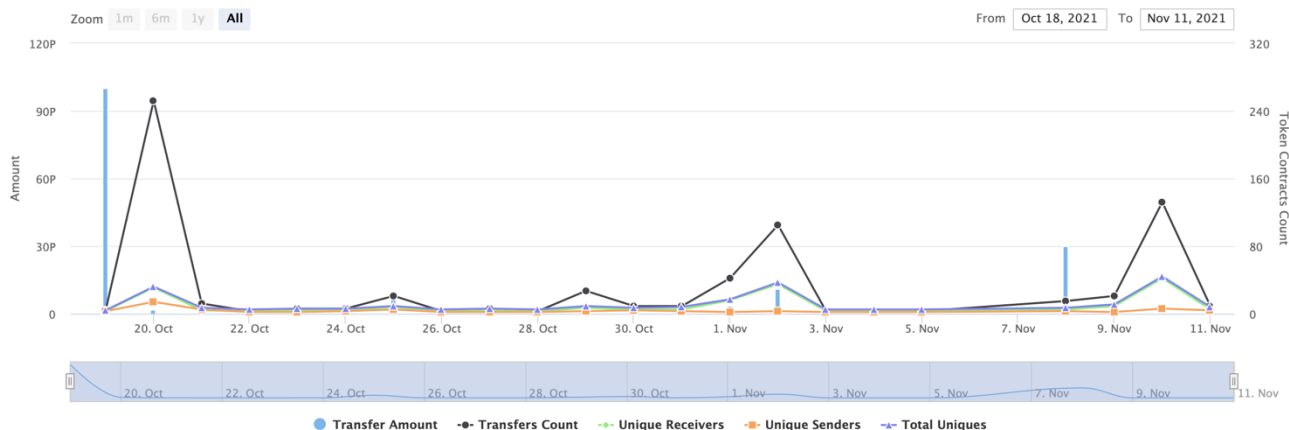
BAD APES Contract Interaction Details

Time Series: Token Contract Overview

Tue 19, Oct 2021 - Thu 11, Nov 2021

Token Contract 0xc4f5424ef52499fa496a07f3fe9daab88553d4c3 (BAD APES)

Source: BscScan.com



BAD APES Top 10 Token Holders

Rank	Address	Quantity	Percentage
1	Burn Address	40,000,513,535,809,900.447992430035667779	40.0023%
2	0xb6705fac676956ab1a60c1c84a73c154db2a4d93	39,810,529,153,680,500.491765681445687726	39.8123%
3	0xa2891fc369c425f6e216e94051ba17a4b7c94312	3,798,493,023,697,500.231362158816811214	3.7987%
4	0x545f5f477f16f36a00d4cca863d79bf78b1405ad	1,321,391,675,872,970	1.3215%
5	0xa68a563e7232ce0c08b7f0de81c84b5504cd7c0e	1,174,570,378,553,750	1.1746%
6	0x75079c9855edb200633e1f728dea276563d6d09	1,031,130,100,548,900.028853409093166212	1.0312%
7	0x4ae90c2c6498adae4ca4c0d9f3b34103311f5c26	1,027,749,081,234,530	1.0278%
8	0x1e39556e9503b4e2d17497faf038de8ca5aad012	964,201,307,071,023.181481148030556658	0.9642%
9	0xc713ff7e5cf9d26963e0dc076ca12e0618f5efd2	734,295,407,175,400.181371360391213066	0.7343%
10	0x1be8fd2fe2b6516880d303a5bd44dbb673a56dff	734,106,486,596,095	0.7341%



Contract functions details

- + Context
 - [Int] _msgSender
 - [Int] _msgData
- + [Int] IBEP20
 - [Ext] totalSupply
 - [Ext] balanceOf
 - [Ext] transfer #
 - [Ext] allowance
 - [Ext] approve #
 - [Ext] transferFrom #
- + [Lib] SafeMath
 - [Int] add
 - [Int] sub
 - [Int] sub
 - [Int] mul
 - [Int] div
 - [Int] div
 - [Int] mod
 - [Int] mod
- + [Lib] Address
 - [Int] isContract
 - [Int] sendValue #
 - [Int] functionCall #
 - [Int] functionCall #
 - [Int] functionCallWithValue #
 - [Int] functionCallWithValue #
 - [Prv] _functionCallWithValue #
- + Ownable (Context)
 - [Pub] owner
 - [Pub] renounceOwnership #
 - modifiers: onlyOwner
 - [Pub] transferOwnership #
 - modifiers: onlyOwner
- + CoinToken (Context, IBEP20, Ownable)
 - [Pub] <Constructor> #
 - [Pub] name
 - [Pub] symbol
 - [Pub] decimals
 - [Pub] totalSupply
 - [Pub] balanceOf
 - [Pub] transfer #
 - [Pub] allowance
 - [Pub] approve #
 - [Pub] transferFrom #
 - [Pub] increaseAllowance #
 - [Pub] decreaseAllowance #

- [Pub] isExcluded
- [Pub] totalFees
- [Pub] totalBurn
- [Pub] totalCharity
- [Pub] deliver #
- [Pub] reflectionFromToken
- [Pub] tokenFromReflection
- [Ext] excludeAccount #
 - modifiers: onlyOwner
- [Ext] includeAccount #
 - modifiers: onlyOwner
- [Ext] setAsCharityAccount #
 - modifiers: onlyOwner
- [Pub] updateFee #
 - modifiers: onlyOwner
- [Prv] _approve #
- [Prv] _transfer #
- [Prv] _transferStandard #
- [Prv] _standardTransferContent #
- [Prv] _transferToExcluded #
- [Prv] _excludedFromTransferContent #
- [Prv] _transferFromExcluded #
- [Prv] _excludedToTransferContent #
- [Prv] _transferBothExcluded #
- [Prv] _bothTransferContent #
- [Prv] _reflectFee #
- [Prv] _getValues
- [Prv] _getTBasics
- [Prv] getTTransferAmount
- [Prv] _getRBasics
- [Prv] _getRTransferAmount
- [Prv] _getRate
- [Prv] _getCurrentSupply
- [Prv] _sendToCharity #
- [Prv] removeAllFee #
- [Prv] restoreAllFee #
- [Prv] _getTaxFee

(\$) = payable function

= non-constant function

Issues Checking Status

Issue description		Checking status
1.	Compiler errors.	Passed
2.	Race conditions and Reentrancy. Cross-function race conditions.	Passed
3.	Possible delays in data delivery.	Passed
4.	Oracle calls.	Passed
5.	Front running.	Passed
6.	Timestamp dependence.	Passed
7.	Integer Overflow and Underflow.	Passed
8.	DoS with Revert.	Passed
9.	DoS with block gas limit.	Low issues
10.	Methods execution permissions.	Passed
11.	Economy model of the contract.	Passed
12.	The impact of the exchange rate on the logic.	Passed
13.	Private user 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.	Safe Open Zeppelin contracts implementation and usage.	Passed
21.	Fallback function security.	Passed

Security Issues

✓ High Severity Issues

No high severity issues found.

✓ Medium Severity Issues

No medium severity issues found.

✓ Low Severity Issues

1. Out of gas

Issue:

- The function `includeAccount()` uses the loop to find and remove addresses from the `_excluded` list. Function will be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.

```
function includeAccount(address account) external onlyOwner() {
    require(!_isExcluded[account], "Account is already included");
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_excluded[i] == account) {
            _excluded[i] = _excluded[_excluded.length - 1];
            _tOwned[account] = 0;
            _isExcluded[account] = false;
            _excluded.pop();
            break;
        }
    }
}
```

- The function `_getCurrentSupply` also uses the loop for evaluating total supply. It also could be aborted with `OUT_OF_GAS` exception if there will be a long excluded addresses list.

```
function _getCurrentSupply() private view returns(uint256, uint256) {
    uint256 rSupply = _rTotal;
    uint256 tSupply = _tTotal;
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_rOwned[_excluded[i]] > rSupply || _tOwned[_excluded[i]] > tSupply) return (_rTotal, _tTotal);
        rSupply = rSupply.sub(_rOwned[_excluded[i]]);
        tSupply = tSupply.sub(_tOwned[_excluded[i]]);
    }
    if (rSupply < _rTotal.div(_tTotal)) return (_rTotal, _tTotal);
    return (rSupply, tSupply);
}
```

Recommendation:

Check that the excluded array length is not too big.

Owner privileges (In the period when the owner is not renounced)

- Owner can include in and exclude from reward.

```
function excludeAccount(address account) external onlyOwner() {
    require(!_isExcluded[account], "Account is already excluded");
    if(_rOwned[account] > 0) {
        _tOwned[account] = tokenFromReflection(_rOwned[account]);
    }
    _isExcluded[account] = true;
    _excluded.push(account);
}

function includeAccount(address account) external onlyOwner() {
    require(_isExcluded[account], "Account is already included");
    for (uint256 i = 0; i < _excluded.length; i++) {
        if (_excluded[i] == account) {
            _excluded[i] = _excluded[_excluded.length - 1];
            _tOwned[account] = 0;
            _isExcluded[account] = false;
            _excluded.pop();
            break;
        }
    }
}
```

- Owner can change charity wallet address.

```
function setAsCharityAccount(address account) external onlyOwner() {
    FeeAddress = account;
}
```

- Owner can update the tax, burn and charity fees.

```
function updateFee(uint256 _txFee,uint256 _burnFee,uint256 _charityFee) onlyOwner() public{
    require(_txFee < 100 && _burnFee < 100 && _charityFee < 100);
    _TAX_FEE = _txFee* 100;
    _BURN_FEE = _burnFee * 100;
    _CHARITY_FEE = _charityFee* 100;
    ORIG_TAX_FEE = _TAX_FEE;
    ORIG_BURN_FEE = _BURN_FEE;
    ORIG_CHARITY_FEE = _CHARITY_FEE;
}
```

Conclusion

Smart contracts contain low severity issues and owner privileges!
Liquidity pair contract's security is not checked due to out of scope.

Liquidity locking details provided by the team:

<https://deeplock.io/lock/0x51F554e55045932e1d8482e92d87AFA039a538d9>

TechRate note:

Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.



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