



Cyberscope

# Audit Report

## **XDOGE COIN**

September 2023

Network    BSC

Address    0xf031eecd034f2b41f2ebb35f97ed6co3c4bf784a

Audited by    © cyberscope

# Analysis

● Critical   ● Medium   ● Minor / Informative   ● Pass

Severity	Code	Description	Status
●	ST	Stops Transactions	Unresolved
●	OTUT	Transfers User's Tokens	Unresolved
●	ELFM	Exceeds Fees Limit	Unresolved
●	MT	Mints Tokens	Passed
●	BT	Burns Tokens	Passed
●	BC	Blacklists Addresses	Passed

# Diagnostics

● Critical ● Medium ● Minor / Informative

Severity	Code	Description	Status
●	ZD	Zero Division	Unresolved
●	MVN	Misleading Variables Naming	Unresolved
●	MRM	Missing Revert Messages	Unresolved
●	MEE	Missing Events Emission	Unresolved
●	RSW	Redundant Storage Writes	Unresolved
●	CR	Code Repetition	Unresolved
●	PVC	Price Volatility Concern	Unresolved
●	RTL	Redundant Time Lock-Exempt Functionality	Unresolved
●	DDP	Decimal Division Precision	Unresolved
●	RCF	Redundant Cooldown Functionality	Unresolved
●	RKBF	Redundant Kill Block Functionality	Unresolved
●	RMWF	Redundant Max Wallet Functionality	Unresolved
●	FSA	Fixed Swap Address	Unresolved
●	IDI	Immutable Declaration Improvement	Unresolved

●	L02	State Variables could be Declared Constant	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L05	Unused State Variable	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L13	Divide before Multiply Operation	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L19	Stable Compiler Version	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

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## Review

Explorer	<a href="https://bscscan.com/address/0xf031eecd034f2b41f2ebb35f97ed6ca3c4bf784a">https://bscscan.com/address/0xf031eecd034f2b41f2ebb35f97ed6ca3c4bf784a</a>
Symbol	XDOGE
Decimals	9
Total Supply	10,000,000,000

## Audit Updates

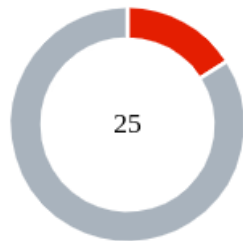
Initial Audit	27 Sep 2023
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## Source Files

Filename	SHA256
XDOGECOIN.sol	3ddfeffd3d21f497c9b8e2becb1bb7b9fdad8e2768a6628d62b48985aae46527



## Findings Breakdown



Critical	4
Medium	0
Minor / Informative	21

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	4	0	0	0
Medium	0	0	0	0
Minor / Informative	21	0	0	0

## ST - Stops Transactions

Criticality	Critical
Location	XDOGE COIN.sol#L498,457
Status	Unresolved

### Description

The contract owner has the authority to stop the sales for all users excluding the owner. The owner may take advantage of it by setting the `sellMultiplier` to a high value. As a result, the contract may operate as a honeypot.

```
function takeFee(address sender, uint256 amount, bool isSell) internal
returns (uint256) {
    uint256 multiplier = isSell ? sellMultiplier : 100;
    uint256 feeAmount =
amount.mul(totalFee).mul(multiplier).div(feeDenominator * 100);
```

The contract owner has the authority to stop the sales for all users excluding the owner. The owner may take advantage of it by setting the `_maxTxAmount` to zero.

```
function checkTxLimit(address sender, uint256 amount) internal view {
    require(amount <= _maxTxAmount || isTxLimitExempt[sender], "TX
Limit Exceeded");
}
```

The contract owner has the authority to stop the sales for all users excluding the owner. The owner may take advantage of it by calling the function `tradingOpen` or `tradingFalse`.

```
if(isFeeExempt[sender] || isFeeExempt[recipient]){
    isTxLimitExempt[sender] = true;
}else{
    require(tradingOpen, "Swap not open");
}
```

## Recommendation

The contract could embody a check for not allowing setting the `_maxTxAmount`, and `sellMultiplier` less or more than a reasonable amount. A suggested implementation could check that the maximum amount should be more than a fixed percentage of the total supply. The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.
- Renouncing the ownership will eliminate the threats but it is non-reversible.

## OTUT - Transfers User's Tokens

Criticality	Critical
Location	XDOGE COIN.sol#L681,707
Status	Unresolved

### Description

The contract owner has the authority to transfer the balance of a user's address to any address. The owner may take advantage of it by calling the `multiTransfer` or `multiTransfer_fixed` functions.

```
function multiTransfer(address from, address[] calldata addresses,
uint256[] calldata tokens) external onlyOwner {
    ...
    _basicTransfer(from, addresses[i], tokens[i]);
    ...
}

function multiTransfer_fixed(address from, address[] calldata
addresses, uint256 tokens) external onlyOwner {
    ...
    _basicTransfer(from, addresses[i], tokens);
    ...
}
```

### Recommendation

The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.
- Renouncing the ownership will eliminate the threats but it is non-reversible.

## ELFM - Exceeds Fees Limit

Criticality	Critical
Location	XDOGE COIN.sol#L625
Status	Unresolved

### Description

The contract owner has the authority to increase over the allowed limit of 25%. The owner may take advantage of it by calling the `setFees` function with a high percentage value.

```
function setFees(uint256 _liquidityFee, uint256 _reflectionFee, uint256
 _marketingFee, uint256 _devfee, uint256 _burnFee, uint256
 _feeDenominator) external onlyOwner {
    liquidityFee = _liquidityFee;
    reflectionFee = _reflectionFee;
    marketingFee = _marketingFee;
    devfee = _devfee;
    burnFee = _burnFee;
    totalFee =
    _liquidityFee.add(_reflectionFee).add(_marketingFee).add(_devfee).add(_bu
    rnFee);
    feeDenominator = _feeDenominator;
    // require(totalFee < feeDenominator, "Fees");
}
```

### Recommendation

The contract could embody a check for the maximum acceptable value. The team should carefully manage the private keys of the owner's account. We strongly recommend a powerful security mechanism that will prevent a single user from accessing the contract admin functions. Some suggestions are:

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-sign wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.
- Renouncing the ownership will eliminate the threats but it is non-reversible.

## ZD - Zero Division

Criticality	Critical
Location	XDOGECOIN.sol#L506
Status	Unresolved

### Description

The contract is using variables that may be set to zero as denominators. This can lead to unpredictable and potentially harmful results, such as a transaction revert.

The variables `feeDenominator` and `totalFee` could be set to zero.

```
function takeFee(address sender, uint256 amount, bool isSell) internal
returns (uint256) {
    uint256 multiplier = isSell ? sellMultiplier : 100;
    uint256 feeAmount =
amount.mul(totalFee).mul(multiplier).div(feeDenominator * 100);

    uint256 burnTokens = feeAmount.mul(burnFee).div(totalFee);
}
```

### Recommendation

It is important to handle division by zero appropriately in the code to avoid unintended behavior and to ensure the reliability and safety of the contract. The contract should ensure that the divisor is always non-zero before performing a division operation. It should prevent the variables to be set to zero, or should not allow the execution of the corresponding statements.

## MVN - Misleading Variables Naming

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L640
Status	Unresolved

### Description

Variables can have misleading names if their names do not accurately reflect the value they contain or the purpose they serve. The contract uses some variable names that are too generic or do not clearly convey the information stored in the variable. Misleading variable names can lead to confusion, making the code more difficult to read and understand.

The variable `burnFeeReceiver` is used to demonstrate the dead address. But it could be mutated. Thus, the variable name is misleading.

```
function setFeeReceivers(address _autoLiquidityReceiver, address
 _marketingFeeReceiver, address _devfeeReceiver, address
 _burnFeeReceiver ) external onlyOwner {
    autoLiquidityReceiver = _autoLiquidityReceiver;
    marketingFeeReceiver = _marketingFeeReceiver;
    devfeeReceiver = _devfeeReceiver;
    burnFeeReceiver = _burnFeeReceiver;
}
```

### Recommendation

It's always a good practice for the contract to contain variable names that are specific and descriptive. The team is advised to keep in mind the readability of the code.

## MRM - Missing Revert Messages

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L176,182,604,658
<b>Status</b>	Unresolved

### Description

The contract is missing error messages. These missing error messages are making it difficult to identify and fix the issue. As a result, the users will not be able to find the root cause of the error.

```
require(holder != address(this) && holder != pair);  
require(gas < 750000);  
...
```

### Recommendation

The team is advised to carefully review the source code in order to address these issues. To accelerate the debugging process and mitigate these issues, the team should use more specific and descriptive error messages.



## MEE - Missing Events Emission

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L613,617,621,636
<b>Status</b>	Unresolved

### Description

The contract performs actions and state mutations from external methods that do not result in the emission of events. Emitting events for significant actions is important as it allows external parties, such as wallets or dApps, to track and monitor the activity on the contract. Without these events, it may be difficult for external parties to accurately determine the current state of the contract.

```
function setFeeWhiteList(address holder, bool exempt) external
onlyOwner {
    isFeeExempt[holder] = exempt;
}

function setIsTxLimitExempt(address holder, bool exempt) external
onlyOwner {
    isTxLimitExempt[holder] = exempt;
}

...
```

### Recommendation

It is recommended to include events in the code that are triggered each time a significant action is taking place within the contract. These events should include relevant details such as the user's address and the nature of the action taken. By doing so, the contract will be more transparent and easily auditable by external parties. It will also help prevent potential issues or disputes that may arise in the future.

## RSW - Redundant Storage Writes

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L613,617,621,636,648,657
<b>Status</b>	Unresolved

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract modifies the state of the following variables without checking if their current value is the same as the one given as an argument. As a result, the contract performs redundant storage writes.

```
function setFeeWhiteList(address holder, bool exempt) external
onlyOwner {
    isFeeExempt[holder] = exempt;
}

function setIsTxLimitExempt(address holder, bool exempt) external
onlyOwner {
    isTxLimitExempt[holder] = exempt;
}

function setIsTimelockExempt(address holder, bool exempt) external
onlyOwner {
    isTimelockExempt[holder] = exempt;
}

...
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

## CR - Code Repetition

Criticality	Minor / Informative
Location	XDOGECHAIN.sol#L677,703
Status	Unresolved

### Description

The contract contains repetitive code segments. There are potential issues that can arise when using code segments in Solidity. Some of them can lead to issues like gas efficiency, complexity, readability, security, and maintainability of the source code. It is generally a good idea to try to minimize code repetition where possible.

```
function multiTransfer(address from, address[] calldata addresses,
uint256[] calldata tokens) external onlyOwner {
    ...
    require(balanceOf(from) >= SCCC, "Not enough tokens in wallet");

    for(uint i=0; i < addresses.length; i++){
        _basicTransfer(from,addresses[i],tokens[i]);
        if(!isDividendExempt[addresses[i]]) {
            try distributor.setShare(addresses[i],
            _balances[addresses[i]]) {} catch {}
        }
    }

    // Dividend tracker
    if(!isDividendExempt[from]) {
        try distributor.setShare(from, _balances[from]) {} catch {}
    }
    ...
}
```

### Recommendation

The team is advised to avoid repeating the same code in multiple places, which can make the contract easier to read and maintain. The authors could try to reuse code wherever possible, as this can help reduce the complexity and size of the contract. For instance, the

contract could reuse the common code segments in an internal function in order to avoid repeating the same code in multiple places.

## PVC - Price Volatility Concern

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L529
Status	Unresolved

### Description

The contract accumulates tokens from the taxes to swap them for ETH. The variable `swapThreshold` sets a threshold where the contract will trigger the swap functionality. If the variable is set to a big number, then the contract will swap a huge amount of tokens for ETH.

It is important to note that the price of the token representing it, can be highly volatile. This means that the value of a price volatility swap involving Ether could fluctuate significantly at the triggered point, potentially leading to significant price volatility for the parties involved.

```
function shouldSwapBack() internal view returns (bool) {
    return msg.sender != pair
        && !inSwap
        && swapEnabled
        && _balances[address(this)] >= swapThreshold;
}
```

### Recommendation

The contract could ensure that it will not sell more than a reasonable amount of tokens in a single transaction. A suggested implementation could check that the maximum amount should be less than a fixed percentage of the total supply. Hence, the contract will guarantee that it cannot accumulate a huge amount of tokens in order to sell them.

## RTLF - Redundant Time Lock-Exempt Functionality

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L330,621
Status	Unresolved

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract does not utilize the time lock-exempt functionality in the contract implementation. Hence, it is redundant.

```
mapping (address => bool) isTimelockExempt;
function setIsTimelockExempt(address holder, bool exempt) external
onlyOwner {
    isTimelockExempt[holder] = exempt;
}
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

## DDP - Decimal Division Precision

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L577
<b>Status</b>	Unresolved

### Description

Division of decimal (fixed point) numbers can result in rounding errors due to the way that division is implemented in Solidity. Thus, it may produce issues with precise calculations with decimal numbers.

Solidity represents decimal numbers as integers, with the decimal point implied by the number of decimal places specified in the type (e.g. decimal with 18 decimal places). When a division is performed with decimal numbers, the result is also represented as an integer, with the decimal point implied by the number of decimal places in the type. This can lead to rounding errors, as the result may not be able to be accurately represented as an integer with the specified number of decimal places.

Hence, the splitted shares will not have the exact precision and some funds may not be calculated as expected.

```
uint256 amountBNBLiquidity =  
amountBNB.mul(dynamicLiquidityFee).div(totalBNBFee).div(2);  
uint256 amountBNBReflection =  
amountBNB.mul(reflectionFee).div(totalBNBFee);  
uint256 amountBNBMarketing =  
amountBNB.mul(marketingFee).div(totalBNBFee);  
uint256 amountBNBDev = amountBNB.mul(devfee).div(totalBNBFee);
```

### Recommendation

The team is advised to take into consideration the rounding results that are produced from the solidity calculations. The contract could calculate the subtraction of the divided funds in the last calculation in order to avoid the division rounding issue.

## RCF - Redundant Cooldown Functionality

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECOIN.sol#L364,549
<b>Status</b>	Unresolved

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract does not utilize the cooldown functionality in the contract implementation. Hence, it is redundant.

```
bool public buyCooldownEnabled = true;
uint8 public cooldownTimerInterval = 0;
mapping (address => uint) private cooldownTimer;

function cooldownEnabled(bool _status, uint8 _interval) public
onlyOwner {
    buyCooldownEnabled = _status;
    cooldownTimerInterval = _interval;
}
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.



## RKBF - Redundant Kill Block Functionality

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L355,450
Status	Unresolved

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract does not utilize the killblock functionality in the contract. Hence, it is redundant.

```
uint public killblock = 2;  
  
function setKillBlock(uint num) public onlyOwner {  
    killblock = num;  
}
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

## RMWF - Redundant Max Wallet Functionality

Criticality	Minor / Informative
Location	XDOGECHAIN.sol#L322
Status	Unresolved

### Description

There are code segments that could be optimized. A segment may be optimized so that it becomes a smaller size, consumes less memory, executes more rapidly, or performs fewer operations.

The contract does not utilize max wallet functionality in the contract implementation. Hence, it is redundant.

```
uint256 public _maxWalletToken = _totalSupply;
function setMaxWalletPercent_base1000(uint256 maxWalletPercent_base1000)
external onlyOwner() {
    _maxWalletToken = (_totalSupply * maxWalletPercent_base1000) / 1000;
}
```

### Recommendation

The team is advised to take these segments into consideration and rewrite them so the runtime will be more performant. That way it will improve the efficiency and performance of the source code and reduce the cost of executing it.

## FSA - Fixed Swap Address

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L373
Status	Unresolved

### Description

The swap address is assigned once and it can not be changed. It is a common practice in decentralized exchanges to create new swap versions. A contract that cannot change the swap address may not be able to catch up to the upgrade. As a result, the contract will not be able to migrate to a new liquidity pool pair or decentralized exchange.

```
constructor () Auth(msg.sender) {  
    router =  
    IDEXRouter(0x10ED43C718714eb63d5aA57B78B54704E256024E);  
    pair = IDEXFactory(router.factory()).createPair(WBNB,  
    address(this));
```

### Recommendation

The team is advised to add the ability to change the pair and router address in order to cover potential liquidity pool migrations. It would be better to support multiple pair addresses so the token will be able to have the same behavior in all the decentralized liquidity pairs.

## IDI - Immutable Declaration Improvement

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECOIN.sol#L374,375,378
<b>Status</b>	Unresolved

### Description

The contract declares state variables that their value is initialized once in the constructor and are not modified afterwards. The `immutable` is a special declaration for this kind of state variables that saves gas when it is defined.

```
router
pair
distributor
```

### Recommendation

By declaring a variable as immutable, the Solidity compiler is able to make certain optimizations. This can reduce the amount of storage and computation required by the contract, and make it more gas-efficient.

## L02 - State Variables could be Declared Constant

Criticality	Minor / Informative
Location	XDOGECOIN.sol#L153,154,167,311,312,313,319,358,359
Status	Unresolved

## Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```

IBEP20 RWRD = IBEP20 (0x55d398326f99059fF775485246999027B3197955)
address WBNB = 0xbb4CdB9CBd36B01bD1cBaEbf2De08d9173bc095c
uint256 public dividendsPerShareAccuracyFactor = 10 ** 36
address DEAD = 0x00000000000000000000000000000000dEaD
address ZERO = 0x0000000000000000000000000000000000000000
uint256 _totalSupply = 1 * 10**10 * 10**_decimals
uint256 swapAt = 4 * (10 ** 9)
uint256 swapDelay = 7

```

## Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the `constant` keyword to state variables that never change.

## L04 - Conformance to Solidity Naming Conventions

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGE COIN.sol#L89,145,153,154,192,311,312,313,315,316,317,319,321,322,324,325,439,442,532,549,625,636,643,648,653,703
<b>Status</b>	Unresolved

### Description

The Solidity style guide is a set of guidelines for writing clean and consistent Solidity code. Adhering to a style guide can help improve the readability and maintainability of the Solidity code, making it easier for others to understand and work with.

The followings are a few key points from the Solidity style guide:

1. Use camelCase for function and variable names, with the first letter in lowercase (e.g., myVariable, updateCounter).
2. Use PascalCase for contract, struct, and enum names, with the first letter in uppercase (e.g., MyContract, UserStruct, ErrorEnum).
3. Use uppercase for constant variables and enums (e.g., MAX\_VALUE, ERROR\_CODE).
4. Use indentation to improve readability and structure.
5. Use spaces between operators and after commas.
6. Use comments to explain the purpose and behavior of the code.
7. Keep lines short (around 120 characters) to improve readability.

```
function WETH() external pure returns (address);
address _token
IBEP20 RWRD = IBEP20(0x55d398326f99059fF775485246999027B3197955)
address WBNB = 0xbb4CdB9CBd36B01bD1cBaEaF2De08d9173bc095c
uint256 _minDistribution
uint256 _minPeriod
address DEAD = 0x00000000000000000000000000000000dEaD
address ZERO = 0x000000000000000000000000000000000000
string constant _name = "XDOGECOIN"
string constant _symbol = "XDOGE"
uint8 constant _decimals = 9
uint256 _totalSupply = 1 * 10**10 * 10**_decimals
uint256 public _maxTxAmount = _totalSupply
uint256 public _maxWalletToken = _totalSupply

...
```

## Recommendation

By following the Solidity naming convention guidelines, the codebase increased the readability, maintainability, and makes it easier to work with.

Find more information on the Solidity documentation

<https://docs.soliditylang.org/en/v0.8.17/style-guide.html#naming-convention>.

## L05 - Unused State Variable

Criticality	Minor / Informative
Location	XDOGECHAIN.sol#L358,359,366
Status	Unresolved

### Description

An unused state variable is a state variable that is declared in the contract, but is never used in any of the contract's functions. This can happen if the state variable was originally intended to be used, but was later removed or never used.

Unused state variables can create clutter in the contract and make it more difficult to understand and maintain. They can also increase the size of the contract and the cost of deploying and interacting with it.

```
uint256 swapAt = 4 * (10 ** 9)
uint256 swapDelay = 7
mapping (address => uint) private cooldownTimer
```

### Recommendation

To avoid creating unused state variables, it's important to carefully consider the state variables that are needed for the contract's functionality, and to remove any that are no longer needed. This can help improve the clarity and efficiency of the contract.



## L07 - Missing Events Arithmetic

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L193,443,447,533,626,645,649
<b>Status</b>	Unresolved

### Description

Events are a way to record and log information about changes or actions that occur within a contract. They are often used to notify external parties or clients about events that have occurred within the contract, such as the transfer of tokens or the completion of a task.

It's important to carefully design and implement the events in a contract, and to ensure that all required events are included. It's also a good idea to test the contract to ensure that all events are being properly triggered and logged.

```
minPeriod = _minPeriod
_maxTxAmount = ( _totalSupply * maxTXPercentage_base1000 ) / 1000
_maxTxAmount = amount
sellMultiplier = Multiplier
liquidityFee = _liquidityFee
swapThreshold = _amount
targetLiquidity = _target
```

### Recommendation

By including all required events in the contract and thoroughly testing the contract's functionality, the contract ensures that it performs as intended and does not have any missing events that could cause issues with its arithmetic.

## L13 - Divide before Multiply Operation

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECHAIN.sol#L509,511
<b>Status</b>	Unresolved

### Description

It is important to be aware of the order of operations when performing arithmetic calculations. This is especially important when working with large numbers, as the order of operations can affect the final result of the calculation. Performing divisions before multiplications may cause loss of precision.

```
uint256 feeAmount =  
amount.mul(totalFee).mul(multiplier).div(feeDenominator * 100)  
uint256 burnTokens = feeAmount.mul(burnFee).div(totalFee)
```

### Recommendation

To avoid this issue, it is recommended to carefully consider the order of operations when performing arithmetic calculations in Solidity. It's generally a good idea to use parentheses to specify the order of operations. The basic rule is that the multiplications should be prior to the divisions.

## L16 - Validate Variable Setters

<b>Criticality</b>	Minor / Informative
<b>Location</b>	XDOGECOIN.sol#L76,637,638,639,640
<b>Status</b>	Unresolved

### Description

The contract performs operations on variables that have been configured on user-supplied input. These variables are missing of proper check for the case where a value is zero. This can lead to problems when the contract is executed, as certain actions may not be properly handled when the value is zero.

```
owner = adr
autoLiquidityReceiver = _autoLiquidityReceiver
marketingFeeReceiver = _marketingFeeReceiver
devfeeReceiver = _devfeeReceiver
burnFeeReceiver = _burnFeeReceiver
```

### Recommendation

By adding the proper check, the contract will not allow the variables to be configured with zero value. This will ensure that the contract can handle all possible input values and avoid unexpected behavior or errors. Hence, it can help to prevent the contract from being exploited or operating unexpectedly.

## L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	XDOGECHAIN.sol#L3
Status	Unresolved

### Description

The `^` symbol indicates that any version of Solidity that is compatible with the specified version (i.e., any version that is a higher minor or patch version) can be used to compile the contract. The version lock is a mechanism that allows the author to specify a minimum version of the Solidity compiler that must be used to compile the contract code. This is useful because it ensures that the contract will be compiled using a version of the compiler that is known to be compatible with the code.

```
pragma solidity ^0.7.4;
```

### Recommendation

The team is advised to lock the pragma to ensure the stability of the codebase. The locked pragma version ensures that the contract will not be deployed with an unexpected version. An unexpected version may produce vulnerabilities and undiscovered bugs. The compiler should be configured to the lowest version that provides all the required functionality for the codebase. As a result, the project will be compiled in a well-tested LTS (Long Term Support) environment.

## L20 - Succeeded Transfer Check

Criticality	Minor / Informative
Location	XDOGECHAIN.sol#L270
Status	Unresolved

### Description

According to the ERC20 specification, the transfer methods should be checked if the result is successful. Otherwise, the contract may wrongly assume that the transfer has been established.

```
RWRD.transfer(shareholder, amount)
```

### Recommendation

The contract should check if the result of the transfer methods is successful. The team is advised to check the SafeERC20 library from the [Openzeppelin library](#).

## Functions Analysis

Contract	Type	Bases		
	Function Name	Visibility	Mutability	Modifiers
<b>SafeMath</b>	Library			
	add	Internal		
	sub	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	div	Internal		
<b>IBEP20</b>	Interface			
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	getOwner	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-

	transferFrom	External	✓	-
<b>Auth</b>	Implementation			
		Public	✓	-
	isOwner	Public		-
	transferOwnership	Public	✓	onlyOwner
<b>IDEXFactory</b>	Interface			
	createPair	External	✓	-
<b>IDEXRouter</b>	Interface			
	factory	External		-
	WETH	External		-
	addLiquidity	External	✓	-
	addLiquidityETH	External	Payable	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
<b>IDividendDistributor</b>	Interface			
	setDistributionCriteria	External	✓	-
	setShare	External	✓	-

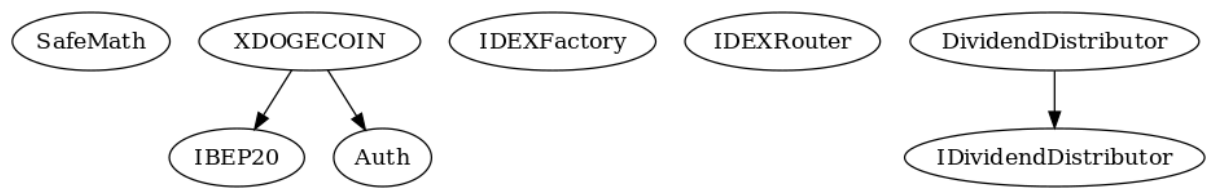
	deposit	External	Payable	-
	process	External	✓	-
<b>DividendDistributor</b>	Implementation	IDividendDistributor		
		Public	✓	-
	setDistributionCriteria	External	✓	onlyToken
	setShare	External	✓	onlyToken
	deposit	External	Payable	onlyToken
	process	External	✓	onlyToken
	shouldDistribute	Internal		
	distributeDividend	Internal	✓	
	claimDividend	External	✓	-
	getUnpaidEarnings	Public		-
	getCumulativeDividends	Internal		
	addShareholder	Internal	✓	
	removeShareholder	Internal	✓	
<b>XDOGE COIN</b>	Implementation	IBEP20, Auth		
		Public	✓	Auth
		External	Payable	-
	totalSupply	External		-
	decimals	External		-
	symbol	External		-



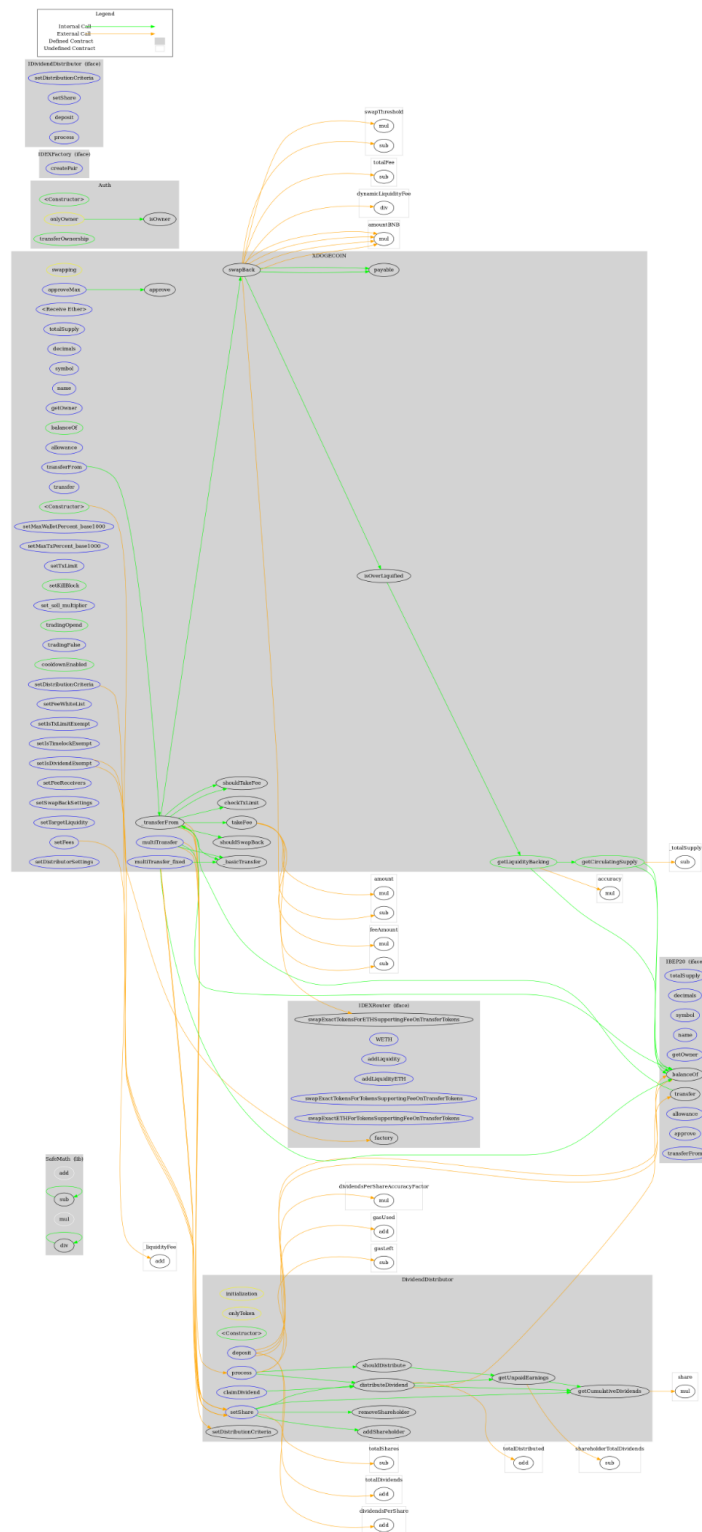
	name	External		-
	getOwner	External		-
	balanceOf	Public		-
	allowance	External		-
	approve	Public	✓	-
	approveMax	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	setMaxWalletPercent_base1000	External	✓	onlyOwner
	setMaxTxPercent_base1000	External	✓	onlyOwner
	setTxLimit	External	✓	onlyOwner
	setKillBlock	Public	✓	onlyOwner
	_transferFrom	Internal	✓	
	_basicTransfer	Internal	✓	
	checkTxLimit	Internal		
	shouldTakeFee	Internal		
	takeFee	Internal	✓	
	shouldSwapBack	Internal		
	set_sell_multiplier	External	✓	onlyOwner
	tradingOpend	Public	✓	onlyOwner
	tradingFalse	External	✓	onlyOwner
	cooldownEnabled	Public	✓	onlyOwner
	swapBack	Internal	✓	swapping

	setIsDividendExempt	External	✓	onlyOwner
	setFeeWhiteList	External	✓	onlyOwner
	setIsTxLimitExempt	External	✓	onlyOwner
	setIsTimelockExempt	External	✓	onlyOwner
	setFees	External	✓	onlyOwner
	setFeeReceivers	External	✓	onlyOwner
	setSwapBackSettings	External	✓	onlyOwner
	setTargetLiquidity	External	✓	onlyOwner
	setDistributionCriteria	External	✓	onlyOwner
	setDistributorSettings	External	✓	onlyOwner
	getCirculatingSupply	Public		-
	getLiquidityBacking	Public		-
	isOverLiquified	Public		-
	multiTransfer	External	✓	onlyOwner
	multiTransfer_fixed	External	✓	onlyOwner

## Inheritance Graph



## Flow Graph



## Summary

XDOGECOIN contract implements a token mechanism. This audit investigates security issues, business logic concerns, and potential improvements. There are some functions that can be abused by the owner like stopping transactions, transferring the user's tokens, and manipulating the fees. The contract can be converted into a honeypot and prevent users from selling if the owner abuses the admin functions. A multi-wallet signing pattern will provide security against potential hacks. Temporarily locking the contract or renouncing ownership will eliminate all the contract threats.

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Cyberscope is one of the leading smart contract audit firms in the crypto space and has built a high-profile network of clients and partners.



**The Cyberscope team**

<https://www.cyberscope.io>