Cyberscope

Audit Report

Moonlabs

March 2023

SHA256 ef21aa22c5ec7b6a4c710a60b57d007f6d872145b5ae7afc485ae023922e5c02
5e585113d852b7be27774d6338591cb425e004f0b13bb25a3fc851869fd9a13a
fdd25ae863e8b3369e07a3dbd88488e3508b3068cc6f3c3cd42ce5f6d8744141
edfb7bf95df1d4e8aae8369e1e335e3fa040dd0a6367e8497537dbcfce776b82
f3ef41718d2bd2a2fd45234063921d24a71bafafa0387eeab0b6b1c41484311b

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Table of Contents

Review

Audit Updates

Initial Audit	09 Mar 2023 https://github.com/cyberscope-io/audits/blob/main/moonlabs/v1/audit.pdf
Corrected Phase 2	20 Mar 2023 https://github.com/cyberscope-io/audits/blob/main/moonlabs/v2/audit.pdf
Corrected Phase 3	24 Mar 2023 https://github.com/cyberscope-io/audits/blob/main/moonlabs/v3/audit.pdf
Corrected Phase 4	04 Apr 2023 https://github.com/cyberscope-io/audits/blob/main/moonlabs/v4/audit.pdf
Corrected Phase 5	20 Apr 2023

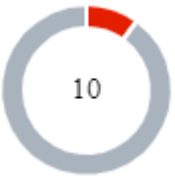
Source Files

Filename	SHA256
IDEXRouter.sol	f6af1340f54f9d239f19282c0177481296b1b10699e094523136f381714afb30
MoonLabsLiquidityLocker.sol	edfb7bf95df1d4e8aae8369e1e335e3fa040dd0a6367e8497537dbcfce776b82
MoonLabsTokenLocker.sol	fdd25ae863e8b3369e07a3dbd88488e3508b3068cc6f3c3cd42ce5f6d8744141
MoonLabsVesting.sol	5e585113d852b7be27774d6338591cb425e004f0b13bb25a3fc851869fd9a13a
MoonLabsWhitelist.sol	ef21aa22c5ec7b6a4c710a60b57d007f6d872145b5ae7afc485ae023922e5c02

Testing Deploy

Contract Name	Explorer
MoonLabsLiquidityLocker	https://testnet.bscscan.com/address/0xD239Ac752cD84ea566dF1cB56F6356c8ef966204
MoonLabsReferral	https://testnet.snowtrace.io/address/0xdCF65098B0873153A86C2408dFD012c4847fF299
MoonLabsTokenLocker	https://testnet.bscscan.com/address/0x7d12fCaF71Ebdd5D03Ca6c2a98ffd0A20c6577D4
MoonLabsVesting	https://testnet.bscscan.com/address/0x37BF4bA8FA330Bb9E8e22ec909b65D9090d16089
MoonLabsWhitelist	https://testnet.bscscan.com/address/0x9B38A1d4B70Ac8C2faF05528306a3048149341d4

Findings Breakdown



Critical	1
Medium	0
Minor / Informative	9

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	1	0	0	0
Medium	0	0	0	0
Minor / Informative	9	0	0	0

Introduction

The Moonlab ecosystem consists of five contracts as upgradable proxies. Two utility contracts and three locker contracts.

MoonLabsWhitelist

The MoonLabsWhitelist contract is used for creating whitelists for Moon Labs products. Whitelisting a token allows users to waive all fees on related Moon Labs products.

Roles

The contract roles consist of the owner role.

The `owner` is responsible for:

- Adding or removing a whitelisted address.
- Claim all contract deposited balance.
- Claim all usdContract token balance.
- The users have the authority to:
- Purchase a whitelist with or without a discount code.
- Check the whitelisted address.
- Add or remove the blacklisted pairs.
- Configure contract address feeCollector, ReferralContract, Router, USDContract, MlabToken
- Set Mlab discount percent.

MoonLabsReferral

The MoonLabsReferral smart contract is used for creating and managing referral codes. It allows users to create referral codes for customers to use while purchasing Moon Labs products.

Roles

The contract roles consist of the owner role.

The `owner` role is responsible for:

- Delete referral code.
- Add reserved codes.
- Assign or remove reserved codes.
- Add or remove addMoonLabsContract.
- Claim all contract deposited balance.
- The user has the authority to:
- Check active codes.
- Get the address to the referral code.
- Get referral code to address.
- Add rewards earned for a code.
- Create, delete, transfer, and reserve referral codes.

MoonLabsVesting

The MoonLabsVesting Contract allows token owners to create ERC20 token locks. The Contract supports creating multiple vesting instances, choosing between linear and standard Locks, and transferring Locks to other addresses. The Contract also includes a feature to buy back and burn the native token, as well as a referral code system and whitelist function. Lock creators cannot modify locks once they have been created, and withdraw owners cannot extend or change lock details.

Roles

The contract roles consist of the owner role.

The `owner` role is responsible for:

- Claim all contract deposited balance.
- Configure contract parameters like address, prices, and thresholds.

The user has the authority to:

- Create one or multiple vesting instances for a single token with fees or without fees or with a discount code.
- Transfer vesting instances ownership.
- Get nonces from address.
- Get the address from nonce.
- Get the lock tokens from the address.
- View claimable tokens.
- Withdraw unlocked tokens.
- Create a lock MLAB token.
- Get MLAB fee.

MoonLabsTokenLocker

The MoonLabsTokenLocker contract is designed to allow users to create locks for ERC20 tokens. Lock creators can extend, transfer, add to, and split locks, but cannot unlock tokens prematurely. Users can create lock instances for the same token and choose either a linear or standard lock. The Contract also includes a feature to buy back and burn the native token, as well as a referral code system and whitelist function.

Roles

The contract roles consist of the owner role.

The `owner` role is responsible for:

- Claim all contract deposited balance.
- Configure contract parameters like important, address, prices, and thresholds.

The user has the authority to:

- Create one or multiple vesting instances for a single token with fees or without fees or with a discount code.
- Transfer vesting instances ownership.
- Get nonces from address.
- Get the address from nonce.
- Get the lock tokens from the address.
- View claimable tokens.
- Withdraw unlocked tokens.
- Change withdrawal address.
- Relock or add tokens to an existing lock with or without fees.
- Divide a lock into multiple locks with or without fees.
- Get claimable tokens.
- Create lock MLAB tokens.
- Relock MLAB tokens.
- split lock MLAB tokens.
- Get MLAB fee.

MoonLabsLiquidityLocker

The MoonLabsLiquidityLocker contract is responsible for creating liquidity locks for Uniswap-based AMM tokens. The main purpose of the contract is to allow users to create locks for selected wallets with the option to choose between standard or linear lock types. The lock type is determined by the start date, with the default being a standard lock. The locked tokens remain locked until their respective unlock date without any exceptions, and lock owners are not allowed to unlock them prematurely. The Contract also includes a feature to buy back and burn the native token, as well as a referral code system and whitelist function.

Roles

The contract roles consist of the owner role.

The `owner` role is responsible for:

- Claim all contract deposited balance.
- Configure contract parameters like importance, address, prices, and thresholds.

The user has the authority to:

- Create one or multiple vesting instances for a single token with fees or without fees or with a discount code.
- Transfer vesting instances ownership.
- Get nonces from address.
- Get the address from nonce.
- Get the lock tokens from the address.
- View claimable tokens.
- Withdraw unlocked tokens.
- Change withdrawal address.
- Relock or add tokens to an existing lock with or without fees.
- Divide a lock into multiple locks with or without fees.

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
●	PTM	Pair Token Mocking	Unresolved
●	TPP	Token Pair Prevalidation	Unresolved
●	AAO	Accumulated Amount Overflow	Unresolved
●	PTAI	Potential Transfer Amount Inconsistency	Unresolved
●	MSC	Missing Sanity Checks	Unresolved
●	CO	Code Optimization	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L14	Uninitialized Variables in Local Scope	Unresolved
●	L16	Validate Variable Setters	Unresolved

PTM - Pair Token Mocking

Criticality	Critical
Location	MoonLabsWhitelist.sol#L321
Status	Unresolved

Description

The contract does not properly validate token pairs, leaving it susceptible to potential token mocking attacks. Attackers could create fake tokens that mimic legitimate ones, potentially leading to unauthorized transactions and loss of funds for the contract and its users.

```
function getIsWhitelisted(
    address _address,
    bool pair
) public view override returns (bool) {
    if (tokenToWhitelist[_address]) return true;
    /// Return false if not pair or pool
    if (!pair) return false;
    /// Check for v2 pairs
    if (_checkV2Pair(_address)) return true;
    /// Check for v3 pools
    if (_checkV3Pool(_address)) return true;
    return false;
}
```

Recommendation

It is recommended to implement robust validation checks to ensure that only legitimate token pairs are used in the contract. For Instance, to ensure that the pair address is legitimate, the contract could leverage a trusted address to access the factory contract's `getPair` function and validate that the returned pair address is identical to the provided argument address.

TPP - Token Pair Prevalidation

Criticality	Minor / Informative
Location	MoonLabsLiquidityLocker.sol#L1020MoonLabsVesting.sol#L822MoonLabsTokenLocker.sol#L1197
Status	Unresolved

Description

The contract allows users to initiate swap transactions between two tokens without first checking if a token pair exists. This could result in the loss of funds if the contract is unable to find a liquidity pool for the specified token pair.

```
function handleBurns() private {
    /// Check if the threshold is met
    uint _burnMeter = burnMeter;
    if (burnMeter >= burnThreshold) {
      /// Buy tokenToBurn via Uniswap router and send to the
dead address
      address[] memory path = new address[](2);
      path[0] = routerContract.WETH();
      path[1] = address(tokenToBurn);

routerContract.swapExactETHForTokensSupportingFeeOnTransferToke
ns{ value: _burnMeter }(0, path,
0x000000000000000000000000000000000000dEaD, block.timestamp);
      _burnMeter = 0;
      burnMeter = _burnMeter;
    }
}
```

Recommendation

It is recommended to pre-validate that a token pair exists before allowing users to initiate swap transactions. A valid pair address should have token0, token1, factory

AAO - Accumulated Amount Overflow

Criticality	Minor / Informative
Location	MoonLabsLiquidityLocker.solMoonLabsTokenLocker.solMoonLabsVesting.sol
Status	Unresolved

Description

The contract is using the variable `nonce` to accumulate values. The contract could lead to an overflow when the total value of a variable exceeds the maximum value that can be stored in that variable's data type. This can happen when an accumulated value is updated repeatedly over time, and the value grows beyond the maximum value that can be represented by the data type.

```
uint64 public nonce; /// Unique lock identifier
```

Recommendation

The team is advised to carefully investigate the usage of the variables that accumulate value. A suggestion is to add checks to the code to ensure that the value of a variable does not exceed the maximum value that can be stored in its data type.

PTAI - Potential Transfer Amount Inconsistency

Criticality	Minor / Informative
Location	MoonLabsWhitelist.sol MoonLabsLiquidityLocker.sol#L923 MoonLabsVesting.sol#L606 MoonLabsTokenLocker.sol#L808
Status	Unresolved

Description

The `transfer()` and `transferFrom()` functions are used to transfer a specified amount of tokens to an address. The fee or tax is an amount that is charged to the sender of an ERC20 token when tokens are transferred to another address. According to the specification, the transferred amount could potentially be less than the expected amount. This may produce inconsistency between the expected and the actual behavior.

The following example depicts the diversion between the expected and actual amount.

Tax	Amount	Expected	Actual
No Tax	100	100	100
10% Tax	100	100	90

```
usdContract.safeTransferFrom(
    address(this),
    msg.sender,
    usdContract.balanceOf(address(this))
);

IERC20Upgradeable(tokenAddress).safeTransferFrom(
    from,
    address(this),
    amount
);
```

Recommendation

The team is advised to take into consideration the actual amount that has been transferred instead of the expected.

It is important to note that an ERC20 transfer tax is not a standard feature of the ERC20 specification, and it is not universally implemented by all ERC20 contracts. Therefore, the contract could produce the actual amount by calculating the difference between the transfer call.

```
 Actual Transferred Amount = Balance After Transfer - Balance Before Transfer
```

MSC - Missing Sanity Checks

Criticality	Minor / Informative
Location	MoonLabsLiquidityLocker.sol MoonLabsVesting.sol MoonLabsTokenLocker.sol
Status	Unresolved

Description

The contract is processing variables that have not been properly sanitized and checked that they form the proper shape. These variables may produce vulnerability issues.

```
function initialize(...){...}
function splitLockETH(address to, uint64 _nonce, uint amount )
external payable {...}
function splitLockPercent(address to, uint64 _nonce, uint
amount) external {...}
function splitLockPercent(address to, address
withdrawalAddress, uint64 _nonce, uint amount ) external {...}
```

Recommendation

The team is advised to properly check the variables according to the required specifications.

- The `initializer` addresses shouldn't be set to zero addresses.
- The `to` addresses shouldn't be set to zero addresses.
- The `withdrawalAddress` addresses shouldn't be set to zero addresses.

CO - Code Optimization

Criticality	Minor / Informative
Location	MoonLabsVesting.sol#L641
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 `depositAmount` and `totalDeposit` are the same. Hence the MathUpgradeable.mulDiv calculation is redundant.

```
MathUpgradeable.mulDiv(
    amountSent,
    depositAmount,
    totalDeposited
),
```

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.

- Redundant code statements could be removed.

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	MoonLabsWhitelist.sol#L44,45,49,83,96,116,145,155,165,175,185,193,202,211,220,229,238,247,257,282,286,297 MoonLabsVesting.sol#L47,48,322,358,359,404,413,422,431,439,447,456,466,476,485,518,557 MoonLabsTokenLocker.sol#L47,48,351,386,387,388,426,463,487,517,553,583,623,671,680,689,698,706,714,722,730,739,749,759,768,778,789,834,878 MoonLabsLiquidityLocker.sol#L63,64,316,346,376,402,424,452,485,514,550,595,604,613,622,630,638,646,654,663,673,683,692,702,713,747,785
Status	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.

```
address _mlabToken
address _feeCollector
uint _costUSD
address _address
uint8 _codeDiscount
uint8 _codeCommission
address _referralAddress
address _routerAddress
address _usdAddress
uint8 _mlabDiscountPercent
uint64 _nonce
uint _burnThreshold
uint _ethLockPrice
uint8 _burnPercent

...
```

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.

L07 - Missing Events Arithmetic

Criticality	Minor / Informative
Location	MoonLabsWhitelist.sol#L186,195,213,260 MoonLabsVesting.sol#L432,469,478 MoonLabsTokenLocker.sol#L699,752,761 MoonLabsLiquidityLocker.sol#L623,676,685
Status	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.

```
costUSD = _costUSD
codeDiscount = _codeDiscount
codeCommission = _codeCommission
mlabDiscountPercent = _mlabDiscountPercent
burnThreshold = _burnThreshold
burnPercent = _burnPercent
 setRelockPrice(uint _ethReloc

t");
        percentLockPrice = _percentLo

onlyOwner {
        requir
```

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.

L14 - Uninitialized Variables in Local Scope

Criticality	Minor / Informative
Location	MoonLabsWhitelist.sol#L390,395,416,421
Status	Unresolved

Description

Using an uninitialized local variable can lead to unpredictable behavior and potentially cause errors in the contract. It's important to always initialize local variables with appropriate values before using them.

```
address _token0
address _token1
```

Recommendation

By initializing local variables before using them, the contract ensures that the functions behave as expected and avoid potential issues.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	MoonLabsWhitelist.sol#L52 MoonLabsVesting.sol#L55 MoonLabsTokenLocker.sol#L55 MoonLabsLiquidityLocker.sol#L71
Status	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.

```
feeCollector = _feeCollector
c ethSplitPrice; /// Price i
```

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.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
IMoonLabsReferral	Interface			
	checkIfActive	External		-
	getAddressByCode	External		-
	addRewardsEarned	External	✓	-
IMoonLabsWhitelist	Interface			
	getIsWhitelisted	External		-
MoonLabsLiquidityLocker	Implementation	Initializable, OwnableUpgradeable, ReentrancyGuardUpgradeable		
	initialize	Public	✓	initializer
	createLockMLAB	External	Payable	-
	createLockPercent	External	✓	-
	createLockEth	External	Payable	-
	createLockWithCodeEth	External	Payable	-
	withdrawUnlockedTokens	External	✓	-
	transferLockOwnership	External	✓	-

	nukeLock	External	✓	-
	relockMLAB	External	Payable	-
	relockETH	External	Payable	-
	relockPercent	External	✓	-
	splitLockMLAB	External	Payable	-
	splitLockETH	External	Payable	-
	splitLockPercent	External	✓	-
	claimETH	External	✓	onlyOwner
	setFeeCollector	External	✓	onlyOwner
	setRouter	External	✓	onlyOwner
	setReferralContract	External	✓	onlyOwner
	setBurnThreshold	External	✓	onlyOwner
	setLockPrice	External	✓	onlyOwner
	setSplitPrice	External	✓	onlyOwner
	setRelockPrice	External	✓	onlyOwner
	setCodeDiscount	External	✓	onlyOwner
	setMlabToken	External	✓	onlyOwner
	setMlabDiscountPercent	External	✓	onlyOwner
	setBurnPercent	External	✓	onlyOwner
	setPercentLockPrice	External	✓	onlyOwner
	setPercentSplitPrice	External	✓	onlyOwner
	setPercentRelockPrice	External	✓	onlyOwner
	getNonceFromOwnerAddress	External		-

	getNonceFromTokenAddress	External		-
	getLock	External		-
	getMLABFee	Public		-
	getClaimableTokens	Public		-
	_buyWithMLAB	Private	✓	
	_relock	Private	✓	
	_splitLock	Private	✓	
	_createLock	Private	✓	
	_transferAndCalculate	Private	✓	
	_transferAndCalculateWithFee	Private	✓	
	_transferTokensFrom	Private	✓	
	_transferTokensTo	Private	✓	
	_handleBurns	Private	✓	
	_distributeCommission	Private	✓	nonReentrant
	_deleteLockInstance	Private	✓	
IMoonLabsReferral	Interface			
	checkIfActive	External		-
	getAddressByCode	External		-
	addRewardsEarned	External	✓	-
IMoonLabsWhitelist	Interface			

	getIsWhitelisted	External		-
MoonLabsTokenLocker	Implementation	Initializable, OwnableUpgradeable, ReentrancyGuardUpgradeable		
	initialize	Public	✓	initializer
	createLockMLAB	External	✓	-
	createLockPercent	External	✓	-
	createLockEth	External	Payable	-
	createLockWithCodeEth	External	Payable	-
	withdrawUnlockedTokens	External	✓	-
	transferLockOwnership	External	✓	-
	setLockWithdrawalAddress	Public	✓	-
	relockMLAB	External	Payable	-
	relockETH	External	Payable	-
	relockPercent	External	✓	-
	splitLockMLAB	External	✓	-
	splitLockETH	External	Payable	-
	splitLockPercent	External	✓	-
	claimETH	External	✓	onlyOwner
	setFeeCollector	External	✓	onlyOwner
	setRouter	External	✓	onlyOwner
	setReferralContract	External	✓	onlyOwner

	setBurnThreshold	External	✓	onlyOwner
	setLockPrice	External	✓	onlyOwner
	setSplitPrice	External	✓	onlyOwner
	setRelockPrice	External	✓	onlyOwner
	setCodeDiscount	External	✓	onlyOwner
	setMlabToken	External	✓	onlyOwner
	setMlabDiscountPercent	External	✓	onlyOwner
	setBurnPercent	External	✓	onlyOwner
	setPercentLockPrice	External	✓	onlyOwner
	setPercentSplitPrice	External	✓	onlyOwner
	setPercentRelockPrice	External	✓	onlyOwner
	getNonceFromOwnerAddress	External		-
	getNonceFromWithdrawalAddress	External		-
	getNonceFromTokenAddress	External		-
	getLock	External		-
	getMLABFee	Public		-
	getClaimableTokens	Public		-
	_buyWithMLAB	Private	✓	
	_relock	Private	✓	
	_splitLock	Private	✓	
	_createLocks	Private	✓	
	_calculateTotalDeposited	Private		
	_transferAndCalculate	Private	✓	

	_transferAndCalculateWithFee	Private	✓	
	_transferTokensFrom	Private	✓	
	_transferTokensTo	Private	✓	
	_handleBurns	Private	✓	
	_distributeCommission	Private	✓	nonReentrant
	_deleteLockInstance	Private	✓	
	_calculateLinearWithdraw	Private		
IMoonLabsReferral	Interface			
	checkIfActive	External		-
	getAddressByCode	External		-
	addRewardsEarned	External	✓	-
IMoonLabsWhitelist	Interface			
	getIsWhitelisted	External		-
MoonLabsVesting	Implementation	Initializable, OwnableUpgradeable, ReentrancyGuardUpgradeable		
	initialize	Public	✓	initializer
	createLockMLAB	External	✓	-
	createLockPercent	External	✓	-
	createLockEth	External	Payable	-

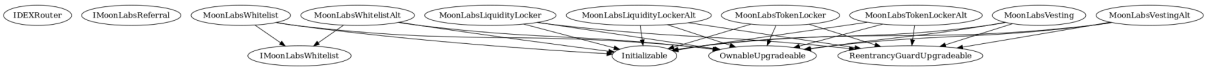
	createLockWithCodeEth	External	Payable	-
	withdrawUnlockedTokens	External	✓	-
	transferVestingOwnership	External	✓	-
	claimETH	External	✓	onlyOwner
	setFeeCollector	External	✓	onlyOwner
	setRouter	External	✓	onlyOwner
	setReferralContract	External	✓	onlyOwner
	setBurnThreshold	External	✓	onlyOwner
	setLockPrice	External	✓	onlyOwner
	setCodeDiscount	External	✓	onlyOwner
	setMlabToken	External	✓	onlyOwner
	setMlabDiscountPercent	External	✓	onlyOwner
	setBurnPercent	External	✓	onlyOwner
	setPercentLockPrice	External	✓	onlyOwner
	getNonceFromWithdrawalAddress	External		-
	getNonceFromTokenAddress	External		-
	getInstance	External		-
	getMLABFee	Public		-
	getClaimableTokens	Public		-
	_buyWithMLAB	Private	✓	
	_createLocks	Private	✓	
	_calculateTotalDeposited	Private		
	_transferAndCalculate	Private	✓	

	_transferAndCalculateWithFee	Private	✓	
	_transferTokensFrom	Private	✓	
	_transferTokensTo	Private	✓	
	_deleteVestingInstance	Private	✓	
	_distributeCommission	Private	✓	nonReentrant
	_handleBurns	Private	✓	
	_calculateLinearWithdraw	Private		
IMoonLabsReferral	Interface			
	checkIfActive	External		-
	getAddressByCode	External		-
	addRewardsEarnedUSD	External	✓	-
IMoonLabsWhitelist	Interface			
	getIsWhitelisted	External		-
MoonLabsWhitelist	Implementation	Initializable, IMoonLabsWhitelist, OwnableUpgradeable		
	initialize	Public	✓	initializer
	purchaseWhitelistMLAB	External	✓	-
	purchaseWhitelist	External	✓	-
	purchaseWhitelistWithCode	External	✓	-

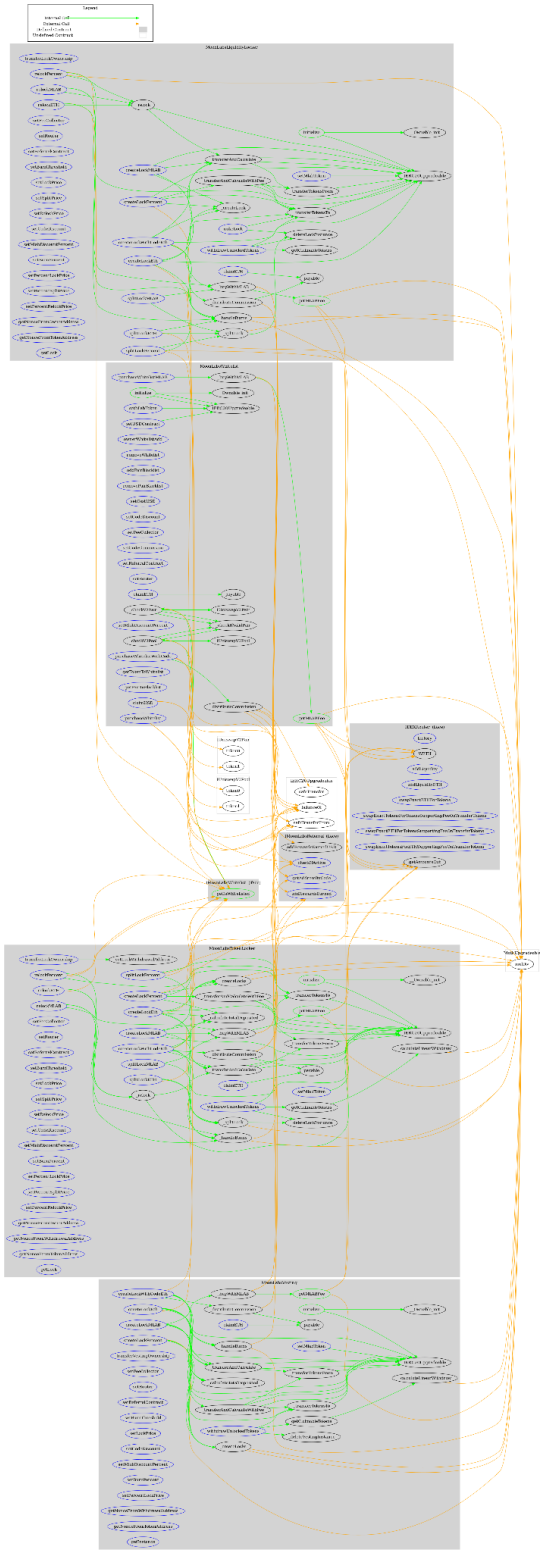
	ownerWhitelistAdd	External	✓	onlyOwner
	removeWhitelist	External	✓	onlyOwner
	addPairBlacklist	External	✓	onlyOwner
	removePairBlacklist	External	✓	onlyOwner
	setCostUSD	External	✓	onlyOwner
	setCodeDiscount	External	✓	onlyOwner
	setFeeCollector	External	✓	onlyOwner
	setCodeCommission	External	✓	onlyOwner
	setReferralContract	External	✓	onlyOwner
	setRouter	External	✓	onlyOwner
	setUSDContract	External	✓	onlyOwner
	setMlabToken	External	✓	onlyOwner
	setMlabDiscountPercent	External	✓	onlyOwner
	claimETH	External	✓	onlyOwner
	claimUSD	External	✓	onlyOwner
	getTokenToWhitelist	External		-
	getPairToBlacklist	External		-
	getIsWhitelisted	Public		-
	getMLABFee	Public		-
	_buyWithMLAB	Private	✓	
	_distributeCommission	Private	✓	
	_checkV2Pair	Private		
	_checkV3Pool	Private		

	_checkIfValidPair	Private		

Inheritance Graph



Flow Graph



Summary

Moonlab's contracts implement a utility, financial, and locker mechanism. This audit investigates security issues, business logic concerns, and potential improvements.

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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

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