Cyberscope

Audit Report

Cake Panda

February 2024

Commit 6726c2bb0e6c1cab61a1b23302125b87904bbdd9

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Review

Repository	https://gitlab.bucle.dev/bucle/dpad/
Commit	6726c2bb0e6c1cab61a1b23302125b87904bbdd9

Audit Updates

Initial Audit	23 Feb 2024

Source Files

Filename	SHA256
Constants.sol	b6e435878c77d8a0db7eb2ed042c5e3d62f5b787e46350e5d93f56e18150ef0f
WithDrawalManager/WithdrawalManager.sol	cf03cf73d8168605dd6fa88e4eab28b8274cdd7a7ecf101b9c32265c14b3a9ae
WithDrawalManager/IWithdrawalManager.sol	5dbc7a9e10acd571ad7327f5fa18965b464843ef1dd5504dd7df585a74414f50
TriggerManager/TriggerManager.sol	21c86a0723de460f4f0f728150f37aebfa9ebca5fd3c4f7760cc49fc6f57dcf9
TriggerManager/ITriggerManager.sol	c934ba33b70b02c75f467b25fecce936b8291d902a5ec30d1c0ee7ad110c742b
Treasury/Treasury.sol	8da4db5a4a94a1eea40a8b0b9d01e7999f15c7d33bccedb5ccd2078309b17669
Treasury/ITreasury.sol	64265e16a86b5e289b562bd46cb80e3d0f5a7c1cc2084b96e08184f0aa157a2d
Token/RelaunchableToken.sol	46b23bb3552055309867943 18c709297e61d95db3154d0db8b2d5fdd03717cdc

Token/ICakePanda.sol	00398f1632bace93433c61ae9a0e2831b2 4130f0a8b9d520859e17ae0dec2d49
Token/CakePanda.sol	62aa52a905d6e8adc440d9da2c330fd989 a6231da3e147d00796a7a0e36b040e
Token/ERC20/ERC20Upgradeable.sol	743217fbd5fc503cde9ce1caf0141318d29 c46e336fdf75d4a3d66ad7efc286b
Token/ERC20/ERC20SnapshotUpgradeable.sol	fa1f4beaf4ef0b6b21db1254f3c9df8cf7f2d 023cd5a0928849f9ceedb543599
TempVaultManager/TempVault.sol	253c04a49ec0ffbe5299452633003ee842f 724fb1f9c791db60c53b522b26598
TempVaultManager/ITempVault.sol	c1acc79642444dfa9696b3ba7cbe7ee9d9 c1cfb5b8216eb10d8c2689ca053d14
StakingManager/StakingManager.sol	91766da4d754a35d987661f1085fe97996 d53dc2b6716f7cdd3583bb849f5f3b
StakingManager/IStakingManager.sol	03a0d8aabee0dedb585032e420e378a8ba 8442097d2462f53b540dd2f1cfe84b
RoleManager/RoleManager.sol	7308a31358e1dee2f1ddf5c8c0eee177654 ea68829d508fc82eeac08bf0468a4
RoleManager/IRoleManager.sol	e153da786eb245399fb49cd1e844f2275a d334ae10f784889884182165d81501
RelaunchManager/Relaunch.sol	8323956e836f59bc30d7b6ca46c07f0bf94 5cc91ef6e0fb1ffe38fa3f93f35b4
RelaunchManager/IRelaunch.sol	7fc0196a2eb62dd595c696df2a2872e4f67 49e7424bafb86c4f4ffa9e5181136
ProxyReferral/ProxyReferral.sol	8026ef7f24232f165a5d6e1ba2b3f5869c2f 492e988256500d7bf09eb30aa64c
ProxyReferral/IProxyReferral.sol	6bbfe98f4620bec6b8133c5b0ecf9233191 b4abb549d30b9c9e20fafcbb0daae

PermanentVaultManager/PermanentVaultManager.sol	2b745751b1fd3a508a81f00a7e3609fefc37de299facbf6268227d7ed4da6f8e
PermanentVaultManager/IPermanentVaultManager.sol	d6df261eff6578cec905e542730cd1a20288494901369649 2813da3408cdc0c7
PermanentVaultManager/Strategy/PCSCakePoolFixedDepositStrategy.sol	663987acd1dd7004959ffdd8d49dac1cf805c63e870d1790bffa2e7b58f67cca
PermanentVaultManager/Strategy/IStrategy.sol	50b5b244554ebfc1426d754ce97079e19bb4a06621114b50c0fe41d251e07a2b
PermanentVault/PermanentVault.sol	c73b1992a2218a33c3f23316851f61b56a66b2ba0f789c17c1e053cd7e78cc0a
PermanentVault/IPermanentVault.sol	34f748f290a21e275bfa0a240dd9fc32e1ebbe0995bf1a9bb176712a63f4cc5a
PenaltyManager/PenaltyManager.sol	07755ace43c5932fd0443c0492d03fa0bb7a17d3fbad0188025e269c3f24d5a2
PenaltyManager/IPenaltyManager.sol	55232e4963d9510f3160b0f05446aaae3e1ec60e186c2bb0db568ad869eae14f
PancakeSwap/IPancakeV2Router02.sol	57b19539d04662d8ac6f780a89171a4a743275d3877bdc987afd7deddd771bb3
PancakeSwap/IPancakeV2Router01.sol	cede0f7573442f999f2b52784c85aa9e7b5e2481b94b90552f9796938c454ded
PancakeSwap/IPancakeV2Pair.sol	6295dd444f15d28d91d89fe7ccd6016a16052c929f43a7956b1f1e5fe567ae1e
PancakeSwap/IPancakeV2Factory.sol	4b0e5c4323795d5dda5ee9978304fa3f2ce503e0f5a2c9583dbcb416aea99b58
OtherAsset/OtherAsset.sol	e0554d16eda2b298fb4016913c6799403869fff042330ef001e44614a6fa05fd
OtherAsset/IOtherAsset.sol	6b063fe18b30a7e43126ca3d1011f8c45c5b2ea391edf66337ccf1420916e8c9

MasterChefPool/MasterChefContract.sol	3dd14b4df43e1f8036ed2072cc980244682dd235ad605335e65c99e556759d59
ContractManager/IContractsV1Manager.sol	f192d8d72d5bd246a9340464ec7141bb002cacfefecdfd84ba3b85c8fc32b635
ContractManager/IContractsManager.sol	92e770f63c70e4a88d966120fa005161175632a8ce93626e84d4bac2e9efe17c
ContractManager/ContractsV1Manager.sol	5e6fa014e7ce2e2cb324da1981e0a8a42f5e49bb682e0fe7994939dcd81859f0
ContractManager/ContractsManager.sol	76027c339c998e5022c27cfbd42f6a4f8ad357d3615594f001e1f107287b19c2
ConfigurableDistributor/IConfigurableDistributor.sol	7159f9c3ddb856ea18c79f5c7791c573db0e62ea89006f7ac48ced212e755b93
ConfigurableDistributor/ConfigurableDistributor.sol	8f41092a933e35a7958bce5a8934bde0475a9f723612e7a52e80a54a9a8a50d5
CakePool/IWTH.sol	b09a530c29f7eea04fb38367c2e6501ac2428a3b60ee8ee772ba99bdbc1ad08b
CakePool/ILpLocker.sol	8ccb79a7e436ae2c69405af232be100a7a06db165caadc34eda4beb390c27911
CakePool/ICakePool.sol	6d6621a5b7fbfb3fa9b1e3291e7aabe47185e8e0ecaa837dcc15d08c9baf2298
CakePool/ICake.sol	180a9c8c22bcd342024f95fa98fb2114280b3988da980e028215c43ddf1df9c7
CakePool/Busd.sol	b72665e0ed112c04c8797c3f25c64861798d0349c1c6ad2d180bb3f52bc46db4

Overview

CakePanda

The CakePanda contract is a token contract that encompasses a comprehensive token economic model. It includes a 6% tax deduction mechanism, penalties for exceeding a minimum 15-day threshold without doing transactions, a relaunch event triggered by either reaching 100 million tokens or 365 days, cake reward distribution, and token burning for stability. This contract is designed to manage various aspects of token dynamics, such as taxation, penalties, and rewards, aligning with specific economic goals like token scarcity and incentivizing certain behaviors. The relaunch event and burn functions serve to adapt the token supply in response to time-based or supply-based triggers, contributing to the token's long-term economic stability.

PenaltyManager

The PenaltyManager contract is designed to penalize users within a gaming ecosystem. It sets criteria for penalties, such as failing to transact more than 10% of their token balance, and introduces a tiered penalty system with four levels. After the fourth penalty, users are removed from the game. A unique aspect of this contract is that penalties can be initiated by other users, and the penalizing user receives a percentage of the penalized user's tokens as a reward. This structure creates a self-regulating community where users are incentivized to monitor and enforce the game's rules, adding an interactive and community-driven dimension to the penalty system. The contract's functionality balances punitive measures with incentives, aiming to maintain fair play and active participation in the game.

TempVault

The TempVault contract in the system plays a pivotal role in managing the 6% tax collected from transactions. It features a function that allows users to trigger a reward mechanism, distributing the collected tax. The distribution involves sending a percentage of the CAPA tokens to the user who triggers the function, a burning percentage of the CAPA tokens, allocating a percentage to the ConfigurableDistributor contract for various actions including liquidity addition, and transferring the final percentage of the CAKE tokens to the Permanent Vault. This sophisticated mechanism not only incentivizes user participation through

rewards but also ensures a dynamic allocation of resources within the ecosystem, contributing to the economic stability and growth of the platform.

PermanentVault

The PermanentVault contract is integral to the reward distribution mechanism, activating a delta event every 14 days. This event triggers the distribution of rewards harvested from the withdrawal manager. It allocates a percentage of the CAKE tokens to the withdrawal manager for user rewards, and the remaining percentage is sent to the PermanentVault Manager. This regular, automated event is key to ensuring a consistent flow of rewards to users, maintaining active participation and engagement within the ecosystem. The contract's design underscores its role in sustaining a balanced and continuous reward system.

PermanentVaultManager

The PermanentVaultManager contract serves as a liaison with the PancakeSwap pool, orchestrating critical functions like depositing and withdrawing funds. The contract includes methods to deposit CAKE into the pool and to withdraw all shares after a relaunch event. This contract's functionality is crucial in managing liquidity and ensuring that the platform's assets are effectively utilized within the broader DeFi ecosystem. By interacting seamlessly with external protocols like PancakeSwap, it enhances the platform's integration and efficiency in the decentralized finance landscape.

StakingManager

The StakingManager contract facilitates the staking mechanism for CAPA tokens, enhancing user engagement within the game. It offers a stake method for users to safely stake their CAPA tokens, an unstake method for token retrieval, and a unique forceunstake method, allowing other users to unstake on behalf of someone and receive a reward for doing so. This contract not only incentivizes users to participate actively in the staking process but also introduces an innovative layer of interaction and reward distribution among users. The combination of these methods ensures fluidity in token circulation and encourages continued participation in the game's ecosystem.

WithdrawalManager

The WithdrawalManager contract is a crucial component of the ecosystem, serving as a hub for users to harvest their rewards. It provides methods like harvest to collect CAKE rewards and harvestOtherAsset for other types of asset rewards. This contract simplifies the process of claiming rewards, whether from the Permanent Vault or other assets within the system. Its design focuses on user convenience and ensures that participants can easily access their earned incentives, fostering a rewarding and engaging experience within the platform.

Relaunch

The Relaunch contract is tasked with initiating a relaunch event in the game, a process called upon by the admin after specific criteria are met, such as reaching 100 million token supply or completing 365 days. The relaunchEvent method resets the game cycle, effectively restarting certain aspects of the game's ecosystem. This includes adjusting user balances, updating staking manager settings, resetting the delta event count, and synchronizing liquidity. The relaunch function is pivotal in maintaining the game's longevity and dynamic, ensuring that the ecosystem remains vibrant and engaging over time.

ConfigurableDistributor

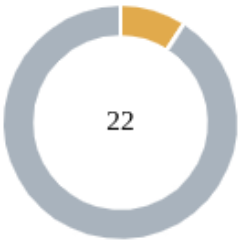
The ConfigurableDistributor contract, called internally by the Temp Vault, manages liquidity and asset distribution within the platform. The addLiquidity method is responsible for adding liquidity to the PancakeSwap pool, involving a percentage of CAPA and WBNB. The sendAssets method, meanwhile, handles the distribution of the remaining funds to other assets. This contract plays a critical role in ensuring efficient allocation and utilization of resources, contributing to the overall liquidity and financial health of the platform. It reflects the platform's commitment to maintaining a balanced and well-managed economic system.

OtherAssets

The OtherAssets contract is a specialized component within the ecosystem, primarily called upon by the ConfigurableDistributor. It has a key role in converting CAPA tokens into reward tokens. The buyTokens method facilitates this conversion, utilizing the platform's integration with PancakeSwap to swap CAPA tokens for the designated reward tokens. Following this conversion, the sessionTrigger method is used to transfer these reward tokens to the WithdrawalManager for distribution as rewards. This process is vital for ensuring that the

rewards distributed to users are diverse and align with the platform's economic strategies. The contract enhances the platform's dynamic reward system by introducing variety and flexibility in the types of rewards offered to users.

Findings Breakdown



Critical	0
Medium	2
Minor / Informative	20

Severity	Unresolved	Acknowledged	Resolved	Other
Critical	0	0	0	0
Medium	0	2	0	0
Minor / Informative	0	20	0	0

Diagnostics

Critical Medium Minor / Informative

Severity	Code	Description	Status
Medium	ITH	Incorrect Tax Handling	Acknowledged
Medium	ULL	Unstake Lock Limitation	Acknowledged
Minor / Informative	CR	Code Repetition	Acknowledged
Minor / Informative	CCR	Contract Centralization Risk	Acknowledged
Minor / Informative	DDP	Decimal Division Precision	Acknowledged
Minor / Informative	IRR	Inaccurate Reward Reset	Acknowledged
Minor / Informative	ITP	Inefficient Transfer Process	Acknowledged
Minor / Informative	MRC	Misleading Reward Calculation	Acknowledged
Minor / Informative	MDC	Missing Duplication Check	Acknowledged
Minor / Informative	MEM	Missing Error Messages	Acknowledged
Minor / Informative	MMU	Multiple Modifier Usage	Acknowledged
Minor / Informative	PBV	Percentage Boundaries Validation	Acknowledged
Minor / Informative	PLPI	Potential Liquidity Provision Inadequacy	Acknowledged
Minor / Informative	PTAI	Potential Transfer Amount Inconsistency	Acknowledged

●	PUV	Potential Unsynchronized Variables	Acknowledged
●	PVC	Price Volatility Concern	Acknowledged
●	RTT	Redundant Token Transfer	Acknowledged
●	TDI	Token Decimal Inconsistency	Acknowledged
●	OCTD	Transfers Contract's Tokens	Acknowledged
●	UAT	Unused Accumulated Tokens	Acknowledged
●	L04	Conformance to Solidity Naming Conventions	Acknowledged
●	L19	Stable Compiler Version	Acknowledged

ITH - Incorrect Tax Handling

Criticality	Medium
Location	MasterChefContract.sol#L112
Status	Acknowledged

Description

The contract is currently implementing a staking mechanism where it transfers the staked amount from the sender to the contract, deducting the `stakeFee`. However, there is an issue with how the contract handles the `taxAmount`. After receiving the staked amount (minus the stakeFee), the contract then transfers the `taxAmount` from its own balance to a specific address. This implementation results in the contract itself bearing the cost of the `taxAmount`, rather than deducting it from the user's staked amount. This approach is inconsistent with typical staking mechanisms where the user is expected to cover any associated fees or taxes.

```
 function stake(uint256 _poolId, uint256 _amount) external {
        require(_amount > 0, "Deposit amount can't be zero");
        Pool storage pool = pools[_poolId];
        StakedUser storage stakedUser =
stakedUsers[_poolId][msg.sender];
        require(block.timestamp <= pool.stakedTime, "staking time
expire");
        require(block.timestamp <= pool.rewardEnd, "pool ended");

        updatePoolRewards(_poolId);
        // Update current staked user
        uint taxAmount = _amount -
            ((_amount * (10000 - pool.stakeFee)) / 10000);
        stakedUser.amount =
            stakedUser.amount +
            ((_amount * (10000 - pool.stakeFee)) / 10000);
        stakedUser.rewardDebt =
            (stakedUser.amount * pool.accumulatedRewardsPerShare) /
            REWARDS_PRECISION;

        // Update pool
        pool.tokensStaked =
            pool.tokensStaked +
            ((_amount * (10000 - pool.stakeFee)) / 10000);

        // Deposit tokens
        emit Stake(msg.sender, _poolId, _amount);
        SafeERC20.safeTransferFrom(
            IERC20(pool.stakeToken),
            msg.sender,
            address(this),
            (_amount * (10000 - pool.stakeFee)) / 10000
        );
        // tax amount transfer to the marketing wallet
        SafeERC20.safeTransfer(
            IERC20(pool.stakeToken),
            0xd21d89F5b91C55A60f6533788ce3711Bd90B8A2C,
            taxAmount
        );
    }
```

Recommendation

It is recommended to adjust the staking logic so that the `taxAmount` is deducted from the user's staked amount, rather than being paid by the contract. This can be achieved by calculating the `taxAmount` as part of the initial staked amount and then transferring the net amount to the contract. The `taxAmount` should then be transferred directly from the

user to the designated address, ensuring that the user covers the entire cost. This change will align the contract's functionality with standard practices and ensure that the contract's balance is not used to cover user-associated costs. Additionally, it will provide transparency and fairness in fee and tax deductions for users participating in staking.

Team Update

The team has acknowledged that this is not a security issue and states:

It is the intended functionality.

ULL - Unstake Lock Limitation

Criticality	Medium
Location	MasterChefContract.sol#L158
Status	Acknowledged

Description

The contract contains the `unStake` function, which includes a requirement that the `isLocked` attribute of a pool must be `true` to proceed with the unstaking process. However, there is no function or mechanism within the contract to alter the `isLocked` state. This oversight can lead to a situation where, if `isLocked` is initially set to `false`, users will be perpetually unable to unstake their assets. This rigidity can significantly impact the functionality and user experience of the contract, potentially leading to user dissatisfaction and trust issues, especially in scenarios where the unlocking of funds is expected to be a flexible and user-controlled process.

```
    function unStake(uint256 _poolId) external {
        Pool storage pool = pools[_poolId];
        StakedUser storage stakedUser =
stakedUsers[_poolId][msg.sender];
        uint256 amount = stakedUser.amount;
        require(pool.isLocked, "can't UnStake");
    ...
    }
```

Recommendation

It is recommended to introduce a function or mechanism that allows for the toggling of the `isLocked` state. This could be an admin-only function to change the lock status or a more dynamic approach based on certain conditions or time frames. Implementing this change will provide the necessary flexibility and control over the unstaking process, aligning the contract's functionality with user expectations and needs. It's crucial to ensure that any such mechanism is secure and aligns with the overall logic and purpose of the contract to maintain integrity and trust.

Team Update

The team has acknowledged that this is not a security issue and states:

Users can be aware of the locked pools.

CR - Code Repetition

Criticality	Minor / Informative
Location	CakePanda.sol#L100,148 PenaltyManager.sol#L77
Status	Acknowledged

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.

Specifically the `transfer` and `transferFrom` functions within the `CakePanda` contract share similar code segments. Additionally the `_triggerPenalty` function also contain similar code logic segments.

```
   function transfer(
        address to,
        uint256 amount
    ) public virtual override returns (bool) {
        ...
          if (isStart) {
            // check any one address is white listed no need to deduct
6% tax
            if (
                penaltyManager.checkWhiteList(owner) ||
                penaltyManager.checkWhiteList(to) ||
                owner == _owner
            ) {
                _transfer(owner, to, amount);
            } else {
                owner == contractV1Manager.primaryPair()
                    ? _penaltyCheck(to, amount)
                    : _penaltyCheck(owner, amount);
                // if penalty applied and  transaction amount less than
balance no need to do transfer
                if (amount <= balanceOf(owner)) {
                    _transfer(owner, to, amount);
                    // 6% temp vault tax and penalty check for current
transaction
                    _transfer(
                        to,
                        contractManager.tempVault(),
                        (amount * tax) / 10000
                    );
                ...
        return true;
    }

    function transferFrom(
        address from,
        address to,
        uint256 amount
    ) public virtual override returns (bool) {
        address spender = _msgSender();
        ...
        }
        return true;
    }
```

```
function _triggerPenalty(address user) internal {
  ...
}
```

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.

Team Update

The team has acknowledged that this is not a security issue.

CCR - Contract Centralization Risk

Criticality	Minor / Informative
Location	PenaltyManager.sol#L231 CakePanda.sol#L260
Status	Acknowledged

Description

The contract's functionality and behavior are heavily dependent on external parameters or configurations. While external configuration can offer flexibility, it also poses several centralization risks that warrant attention. Centralization risks arising from the dependence on external configuration include Single Point of Control, Vulnerability to Attacks, Operational Delays, Trust Dependencies, and Decentralization Erosion.

Specifically the contract includes a functionality that allows the admin to set the tax variable to any value and to batch whitelist specific addresses. This capability grants the admin substantial control, enabling them to selectively authorize certain addresses with specific privileges within the contract.

```
  function batchWhitelisting(
        address[] memory addresses,
        bool _isWhiteList
    ) external onlyAdmin {
        for (uint i = 0; i < addresses.length; i++) {
            isWhiteList[addresses[i]] = _isWhiteList;
        }
    }

function updateTempTax(uint _tax) external onlyAdmin {
    tax = _tax;
}
```

Recommendation

To address this finding and mitigate centralization risks, it is recommended to evaluate the feasibility of migrating critical configurations and functionality into the contract's codebase itself. This approach would reduce external dependencies and enhance the contract's

self-sufficiency. It is essential to carefully weigh the trade-offs between external configuration flexibility and the risks associated with centralization.

Team Update

The team has acknowledged that this is not a security issue.

DDP - Decimal Division Precision

Criticality	Minor / Informative
Location	StakingManager.sol#L210
Status	Acknowledged

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.

```
        if (
            !cakePanda.transfer(stakeOwnerUser, (_stakeAmount * 7500) /
10000)
        ) {
            revert("transfer failed");
        } // 75% transfer to stake owner balance
        if (!cakePanda.transfer(msg.sender, (_stakeAmount * 250) /
10000)) {
            revert("transfer failed");
        } // 2.5% transfer to triggering user
        cakePanda.burn((_stakeAmount * 2250) / 10000); // 22.5% transfer
to burn
```

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.

Team Update

The team has acknowledged that this is not a security issue.

IRR - Inaccurate Reward Reset

Criticality	Minor / Informative
Location	MasterChefContract.sol#L226
Status	Acknowledged

Description

The contract is using the `_harvestRewards` function where is handling the `rewardsToHarvest`. When `rewardsToHarvest` calculates to zero, the function updates `stakedUser.rewardDebt` but does not reset `stakedUser.rewards` to zero. This oversight can lead to inaccurate reward tracking, as `stakedUser.rewards` might retain a previous non-zero value even when no new rewards are harvested. This inconsistency can cause confusion and potential errors in reward distribution, as users might appear to have rewards due when, in fact, they do not.

```
    function _harvestRewards(uint256 _poolId) internal {
        ...
        uint256 rewardsToHarvest = ((stakedUser.amount *
            pool.accumulatedRewardsPerShare) / REWARDS_PRECISION) -
            stakedUser.rewardDebt;
        if (rewardsToHarvest == 0) {
            stakedUser.rewardDebt =
                (stakedUser.amount * pool.accumulatedRewardsPerShare) /
                REWARDS_PRECISION;
            return;
        }
        stakedUser.rewards = rewardsToHarvest;
        stakedUser.rewardDebt =
            (stakedUser.amount * pool.accumulatedRewardsPerShare) /
            REWARDS_PRECISION;
    }
```

Recommendation

It is recommended to explicitly `stakedUser.rewardDebt` to zero in the scenario where `rewardsToHarvest` equals zero. This adjustment ensures that the user's reward balance accurately reflects the absence of new rewards to harvest. By doing so, the contract will maintain consistent and accurate accounting of user rewards, preventing any

misleading information about available rewards. This change will enhance the reliability and clarity of the reward mechanism within the contract.

Team Update

The team has acknowledged that this is not a security issue.

ITP - Inefficient Transfer Process

Criticality	Minor / Informative
Location	Treasury.sol#L56
Status	Acknowledged

Description

The contract's `multiSenderToken` function currently handles token transfers in a manner that could be optimized for efficiency. In its present form, the function iterates through arrays of receivers, amounts, and tokens, performing a `safeTransferFrom` followed by an additioanal `safeTransferFrom` for each iteration. This approach results in two separate `safeTransferFrom` calls per iteration. One to move tokens from the sender to the contract, and another to send them from the contract to the receiver. This method is inefficient as it doubles the number of transfer operations required, leading to increased gas costs and potential delays in processing multiple transactions.

```
function multiSenderToken(
        address[] calldata receivers,
        uint[] calldata amounts,
        address[] calldata tokens
    ) external {
        require(
            receivers.length == amounts.length &&
                amounts.length == tokens.length,
            "Inappropriate Data"
        );
        for (uint i = 0; i < receivers.length; i++) {
            SafeERC20Upgradeable.safeTransferFrom(
                IERC20Upgradeable(tokens[i]),
                msg.sender,
                address(this),
                amounts[i]
            );
            SafeERC20Upgradeable.safeTransfer(
                IERC20Upgradeable(tokens[i]),
                receivers[i],
                amounts[i]
            );
        }
    }
```

Recommendation

It is recommended to consolidate the transfer operations in the `multiSenderToken` function to reduce the number of transactions and optimize gas usage. One approach is to first calculate the total amount of each token to be transferred from the sender to the contract, and then perform a single transferFrom for each token type. After accumulating the tokens in the contract, the function can then proceed to distribute them to the respective receivers. This method will significantly reduce the number of transfer calls, thereby saving gas and making the function more efficient. Additionally, implementing this change will enhance the contract's performance, especially when handling a large number of transfers.

Team Update

The team has acknowledged that this is not a security issue.

In most cases, this function is designed to to be used by the admin.

MRC - Misleading Reward Calculation

Criticality	Minor / Informative
Location	PermanentVault.sol#L211 WithdrawalManager.sol#L318
Status	Acknowledged

Description

The contract utilizes the `getIndexOfDeltaRewardTokenAddress` function, which returns zero if the `tokenAddress` is found in the first iteration (i.e., i = 0) of its loop. This calculation is misleading because the function is utilized in reward calculations, specifically in the `_reward` array indexing. Since arrays in Solidity are zero-indexed, returning zero for a valid first entry (at index 0) is indistinguishable from the return value when `tokenAddress` is not found at all. Consequently, this leads to misleading and incorrect reward calculations, as the first entry in the `deltaRewardTokens` array is effectively ignored or treated as an absent token.

```
    function getIndexOfDeltaRewardTokenAddress(
        address tokenAddress
    ) external view returns (uint) {
        for (uint i = 0; i < deltaRewardTokens.length; i++) {
            if (deltaRewardTokens[i] == tokenAddress) {
                return i;
            }
        }
        return 0;
    }
```

```
    function calculateSeasonReward(
        address user
    ) public view returns (uint[] memory, address[] memory) {
        ...
            _reward[
                permanentVault.getIndexOfDeltaRewardTokenAddress(
                    seasonReward[address(this)][seasonRewardId[i]].token
                )
            ] +=
                (seasonReward[address(this)][seasonRewardId[i]].reward *
                    (((cakePanda.balanceOfAt(user, seasonRewardId[i]) +
                        stakingManager.stakeAmount(user)) * 10000) /

getTokenDistributedAtSnapshot(seasonRewardId[i]))) /
                10000;
        }
        return (_reward, tokenAddress);
    }
```

Recommendation

It is recommended to modify the `getIndexOfDeltaRewardTokenAddress` function to return a value that clearly differentiates between a valid index and a 'not found' scenario. One approach is to return `i + 1` instead of i, and use a special value to indicate that the tokenAddress is not found. Corresponding adjustments should be made in the reward calculation logic to account for this change, ensuring that the correct index is used and that the 'not found' scenario is appropriately handled. This modification will provide accurate and reliable reward calculations, maintaining the integrity of the contract's functionality.

Team Update

The team has acknowledged that this is not a security issue and states:

The deltaTokensAddress length will not be zero.

MDC - Missing Duplication Check

Criticality	Minor / Informative
Location	WithdrawalManager.sol#L232 PermanentVault/PermanentVault.sol#L170
Status	Acknowledged

Description

The contract is missing duplication checks in the `addReward`, `addOtherAssetReward`, `addSeasonReward`, and `updateDeltaRewardTokenAddress` functions. These functions allow adding or updating rewards and token addresses without verifying if the provided `_id` or `_deltaRewardTokenAddress` already exists. This oversight can lead to duplicate entries or unnecessary state changes, potentially causing inconsistencies and inefficiencies in the contract's operation.

```
    function addReward(
        uint _reward,
        uint _id,
        address _tokenAddress
    ) external onlyPermanentVaultAndPermanentVaultManager {
        rewardsDeltaEvent[address(this)][_id].reward = _reward;
        rewardsDeltaEvent[address(this)][_id].token = _tokenAddress;
        deltaRewardId.push(_id);
    }
    function addOtherAssetReward(
        uint _reward,
        uint _id,
        address _tokenAddress
    ) external onlyOtherAsset {
        otherAssetReward[address(this)][_id].reward = _reward;
        otherAssetReward[address(this)][_id].token = _tokenAddress;
        otherAssetRewardId.push(_id);
    }
    function addSeasonReward(
        uint _reward,
        uint _id,
        address _tokenAddress
    ) external onlyPermanentVaultAndPermanentVaultManager {
        seasonReward[address(this)][_id].reward = _reward;
        seasonReward[address(this)][_id].token = _tokenAddress;
        seasonRewardId.push(_id);
    }
...
  function updateDeltaRewardTokenAddress(
        address _deltaRewardTokenAddress
    ) external onlyAdmin {
        ...
    }
```

Recommendation

It is recommended to introduce validation mechanisms in the mentioned functions to verify the uniqueness of `_id` and the novelty of `_deltaRewardTokenAddress` before processing. Implementing checks against a record of used _ids and the current delta reward token address will prevent duplication and redundant updates, enhancing the contract's reliability and efficiency. Additionally, thorough testing should be conducted post-implementation to ensure the effectiveness of these safeguards.

Team Update

The team has acknowledged that this is not a security issue and states:

We are maintaining history of particular tokens rewards which can be multiple times.

MEM - Missing Error Messages

Criticality	Minor / Informative
Location	WithDrawalManager/WithdrawalManager.sol#L354 Token/CakePanda.sol#L58,62 OtherAsset/OtherAsset.sol#L89
Status	Acknowledged

Description

The contract is missing error messages. These are no error messages to accurately reflect the problem, 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(
            _roleManager.isAdmin(msg.sender) ||
                msg.sender == contractsManager.relaunchManager()
        )
require(msg.sender == contractManager.penaltyManager())
require(msg.sender == contractManager.relaunchManager())
require(msg.sender == contractsManager.relaunchManager())
```

Recommendation

The team is suggested to provide a descriptive message to the errors. This message can be used to provide additional context about the error that occurred or to explain why the contract execution was halted. This can be useful for debugging and for providing more information to users that interact with the contract.

Team Update

The team has acknowledged that this is not a security issue.

MMU - Multiple Modifier Usage

Criticality	Minor / Informative
Location	ConfigurableDistributor.sol#L43 PermanentVault.sol#L43
Status	Acknowledged

Description

The contract is currently utilizing a `onlyAdmin` modifier across multiple contracts, which involves querying the `IRoleManager` to check if `msg.sender` is an admin. This approach, while functional, leads to redundancy and potential maintenance challenges, as the same modifier logic is replicated in various parts of the system. Each contract containing this modifier independently performs the admin role check, which can lead to inconsistencies if any changes are required in the role management logic. Additionally, this redundancy increases the overall contract size and complexity, potentially impacting gas costs and readability.

```
modifier onlyAdmin() {
      IRoleManager _roleManager = IRoleManager(
          contractsManager.roleManager()
      );
      require(
          _roleManager.isAdmin(msg.sender),
          "ContractsManager: Restricted to only admin."
      );
      _;
  }
```

Recommendation

It is recommended to centralize role management by creating a single, general system or contract that handles all role-based access controls, including the admin role verification. This system can then be inherited or integrated by other contracts that require role-based access control. By centralizing this logic, any updates or modifications to role management will only need to be made in one place, ensuring consistency across the entire system. This approach will reduce redundancy, simplify contract maintenance, and potentially decrease

deployment and execution costs due to reduced code duplication. Additionally, it will enhance the security and robustness of the role management mechanism.

Team Update

The team has acknowledged that this is not a security issue.

PBV - Percentage Boundaries Validation

Criticality	Minor / Informative
Location	ProxyReferral/ProxyReferral.sol#L387 WithDrawalManager/WithdrawalManager.sol#L187
Status	Acknowledged

Description

The contract is currently handling percentage calculations without a crucial check to prevent these values from exceeding 100%. This issue is evident in instances where percentages are derived through the manipulation of various variables. In the absence of a guardrail, there's a significant risk that these calculations could yield values that are logically and financially infeasible, potentially leading to overflows or other unintended consequences. This oversight can disrupt the contract's economic mechanisms and undermine its integrity.

```
    function updateMegaRewardPercentage(
        uint _megaRewardPercentage
    ) external onlyAdmin {
        megaRewardPercentage = _megaRewardPercentage;
    }

    function _distributeHarvestSeasonReward(address user) internal {
        ...
        uint referral_percentage = proxyReferral.megaRewardPercentage();
        ...
        for (uint i = 0; i < tokenAddresses.length; i++) {
            ...
                    uint _reward = (reward[i] * referral_percentage) /
10000;
                ...
                }
```

Recommendation

It is recommended to introduce stringent checks in all parts of the contract where percentage calculations are performed. These checks should ensure that the resulting value from any percentage-based computation does not surpass 100%. The implementation of a verification step before each calculation can effectively prevent values from exceeding the

maximum percentage threshold. By standardizing this practice across all contracts, safeguarding against errors and maintaining the contract's overall integrity is achievable.

Team Update

The team has acknowledged that this is not a security issue and states:

This function is designed to to be used by the admin.

PLPI - Potential Liquidity Provision Inadequacy

Criticality	Minor / Informative
Location	OtherAsset.sol#L104
Status	Acknowledged

Description

The contract operates under the assumption that liquidity is consistently provided to the pair between the contract's token and the native currency. However, there is a possibility that liquidity is provided to a different pair. This inadequacy in liquidity provision in the main pair could expose the contract to risks. Specifically, during eligible transactions, where the contract attempts to swap tokens with the main pair, a failure may occur if liquidity has been added to a pair other than the primary one. Consequently, transactions triggering the swap functionality will result in a revert.

```
        address[] memory path = new address[](3);
         path[0] = contractsManager.tokenAddress();
         path[1] = contractsManager.WETH();
         path[2] = otherAssetTokenAddress;

pancakeRouter.swapExactTokensForTokensSupportingFeeOnTransferTokens(
             cakePanda.balanceOf(address(this)),
             0,
             path,
             address(this),
             block.timestamp
         );
```

Recommendation

The team is advised to implement a runtime mechanism to check if the pair has adequate liquidity provisions. This feature allows the contract to omit token swaps if the pair does not have adequate liquidity provisions, significantly minimizing the risk of potential failures.

Furthermore, the team could ensure the contract has the capability to switch its active pair in case liquidity is added to another pair.

Additionally, the contract could be designed to tolerate potential reverts from the swap functionality, especially when it is a part of the main transfer flow. This can be achieved by executing the contract's token swaps in a non-reversible manner, thereby ensuring a more resilient and predictable operation.

Team Update

The team has acknowledged that this is not a security issue and states:

Liquidity is properly maintained outside of the contract so no need to implement a check.

PTAI - Potential Transfer Amount Inconsistency

Criticality	Minor / Informative
Location	StakingManager.sol#L75 PCSCakePoolFixedDepositStrategy.sol#L23 Treasury.sol#L49
Status	Acknowledged

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

```
    function stake() external virtual override returns (bool) {
        ICakePool cakePool = ICakePool(contractsManager.cakePool());
        uint tokenBalance = IERC20Upgradeable(contractsManager.cake())
            .balanceOf(address(this));
        IERC20Upgradeable(contractsManager.cake()).approve(
            contractsManager.cakePool(),
            tokenBalance
        );
        cakePool.deposit(tokenBalance, 0);
        return true;
    }


    function stake(uint amount) external {
        ...
    }

    function multiSenderToken(
        address[] calldata receivers,
        uint[] calldata amounts,
        address[] calldata tokens
    ) external {
        ...
        for (uint i = 0; i < receivers.length; i++) {
            IERC20Upgradeable(tokens[i]).transferFrom(
                msg.sender,
                address(this),
                amounts[i]
            );
            IERC20Upgradeable(tokens[i]).transfer(receivers[i],
amounts[i]);
        }
    }
```

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`

Team Update

The team has acknowledged that this is not a security issue and states:

We already know that each transaction has to pay tax so there always be fewer tokens to reach the destination

PUV - Potential Unsynchronized Variables

Criticality	Minor / Informative
Location	WithdrawalManager.sol#L232,260
Status	Acknowledged

Description

The contract is currently facing a synchronization issue due to the way reward IDs are managed. Functions like `addReward` can be called through the manager contract, allowing for the addition of reward IDs that may not exist in the vault contract. This situation creates a risk where the reward ID list can be modified with invalid or non-existent IDs. Consequently, functions like `calculateReward`, which rely on these values, may not work as expected. The lack of validation for reward IDs in the `calculateReward` function means it could process incorrect or irrelevant data, leading to inaccurate reward calculations and potential inconsistencies in reward distribution.

```
    function addReward(
        uint _reward,
        uint _id,
        address _tokenAddress
    ) external onlyPermanentVaultAndPermanentVaultManager {
        rewardsDeltaEvent[address(this)][_id].reward = _reward;
        rewardsDeltaEvent[address(this)][_id].token = _tokenAddress;
        deltaRewardId.push(_id);
    }

    function calculateReward(
        address user
    ) public view returns (uint[] memory, address[] memory) {
        ICakePanda cakePanda =
ICakePanda(contractsManager.tokenAddress());
        IStakingManager stakingManager = IStakingManager(
            contractsManager.stakingManager()
        );
        IPermanentVault permanentVault = IPermanentVault(
            contractsManager.permanentVault()
        );

        address[] memory tokenAddress =
permanentVault.getDeltaRewardTokens();
        uint[] memory _reward = new uint[](tokenAddress.length);

            ...
        return (_reward, tokenAddress);
    }
```

Recommendation

It is recommended to implement a validation mechanism in the `calculateReward` function to ensure that each `deltaRewardId` used in the calculation corresponds to a valid and existing reward in the vault. This can be achieved by cross-referencing the `deltaRewardId` with a list of valid IDs maintained in the vault contract or by introducing a verification method within the vault contract that confirms the existence and validity of a given reward ID. By adding this layer of validation, the contract will ensure synchronization between the manager and vault contracts, maintaining the integrity and accuracy of reward calculations. This change is crucial for preventing errors and ensuring that the reward distribution aligns with the intended logic of the contract.

Team Update

The team has acknowledged that this is not a security issue and states:

There is an access modifier so not anyone can add a reward ID.

PVC - Price Volatility Concern

Criticality	Minor / Informative
Location	TempVault.sol#L64
Status	Acknowledged

Description

The contract accumulates tokens from the taxes to swap them for ETH. The variable `minLimit` 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 grabFireBites() external onlyWhiteListed {
        IConfigurableDistributor configurableDistributor =
IConfigurableDistributor(
                contractsManager.configurableDistributor()
            );
        pancakeV2Router =
IPancakeV2Router02(contractsManager.pcsRouter());
        uint tokenBalance =
IERC20Upgradeable(contractsManager.tokenAddress())
            .balanceOf(address(this));
        // it our business logic to have activate this greater than
equal to 5000 weth to trigger
        require(
            checkMinimumLimit(tokenBalance),
            "Balance Should be 5000 WETH to Trigger"
        );
        // 1% CAPA to triggered user
        SafeERC20Upgradeable.safeTransfer(
            IERC20Upgradeable(contractsManager.tokenAddress()),
            msg.sender,
            (tokenBalance * rewardPercentage) / 10000
        );
        // 33% CAPA BURN
        ICakePanda(contractsManager.tokenAddress()).burn(
            (tokenBalance * burnPercentage) / 10000
        );
        // 33% CAPA TO ConfigurableDistributor
        SafeERC20Upgradeable.safeTransfer(
            IERC20Upgradeable(contractsManager.tokenAddress()),
            contractsManager.configurableDistributor(),
            (tokenBalance * otherAssetPercentage) / 10000
        );
        configurableDistributor.addLiquidity();
        // 33% CAKE TO PERMANENT VAULT
        SafeERC20Upgradeable.safeApprove(
            IERC20Upgradeable(contractsManager.tokenAddress()),
            contractsManager.pcsRouter(),

IERC20Upgradeable(contractsManager.tokenAddress()).balanceOf(
                address(this)
            )
        );
        ...
        }
```

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 exchange reserves. Hence, the contract will guarantee that it cannot accumulate a huge amount of tokens in order to sell them.

Team Update

The team has acknowledged that this is not a security issue and states:

We will manage through admin to make sure that a valid number of tokens should sell on grabfirebuytes temp vault function.

RTT - Redundant Token Transfer

Criticality	Minor / Informative
Location	ProxyReferral.sol#L167
Status	Acknowledged

Description

The contract is currently employing a redundant token transfer mechanism. Instead of directly sending the funds to the intended recipients, it first transfers the tokens to the contract itself using an extra `transferFrom` function. This is observed in the code which moves tokens from the `referral1Address` address to the contract. Subsequently, two separate transfer calls are made to distribute the rewards to `msg.sender` and `_referral.referer`. This approach not only adds unnecessary complexity and gas costs but also exposes the tokens to potential risks while they are temporarily held by the contract.

```
            SafeERC20Upgradeable.safeTransferFrom(
                IERC20Upgradeable(referral1RewardToken),
                referral1Address,
                address(this),
                referrer_reward
            );
            uint halfReward = referrer_reward / 2;
            SafeERC20Upgradeable.safeTransfer(
                IERC20Upgradeable(referral1RewardToken),
                msg.sender,
                referrer_reward - halfReward
            );
            SafeERC20Upgradeable.safeTransfer(
                IERC20Upgradeable(referral1RewardToken),
                _referral.referer,
                halfReward
            );
```

Recommendation

It is recommended to streamline the fund transfer process by directly transferring the funds to the recipients. This can be achieved by replacing the initial `transferFrom` call with

direct transfer calls to `msg.sender` and `_referral.referer` from the `referral1Address`. This modification will reduce gas consumption, simplify the transaction flow, and minimize the risk associated with the temporary holding of tokens in the contract.

Team Update

The team has acknowledged that this is not a security issue and states:

It is the intended functionality.

TDI - Token Decimal Inconsistency

Criticality	Minor / Informative
Location	PermanentVault.sol#L186
Status	Acknowledged

Description

The contract is equipped with the capability to update the `deltaRewardTokenAddress` through the `updateDeltaRewardTokenAddress` function. However, a significant oversight is that the contract does not verify if the new token address has the same decimal configuration as the previous `deltaRewardTokenAddress`. This lack of verification can lead to calculation errors in functions like `withdrawalManager.addReward`, as different tokens can have varying decimal places. The discrepancy in decimals can significantly impact calculations involving token amounts, leading to incorrect reward distributions or financial imbalances within the contract.

```
    function updateDeltaRewardTokenAddress(
        address _deltaRewardTokenAddress
    ) external onlyAdmin notZeroAddress(_deltaRewardTokenAddress) {
        ...
        deltaRewardTokenAddress = _deltaRewardTokenAddress;
        deltaRewardTokens.push(_deltaRewardTokenAddress); // addresses
array of tokens updated
    }
```

Recommendation

It is recommended to include a check to verify and handle appropriately the token decimals of the new address being set. This could involve querying the decimal property of the new token address and comparing it with the existing token's decimals, or implementing a mechanism to adjust calculations based on the decimal differences. Ensuring decimal consistency or compatibility is crucial for maintaining accuracy in token-related calculations and preventing potential issues in reward distribution or token management.

Team Update

The team has acknowledged that this is not a security issue.

OCTD - Transfers Contract's Tokens

Criticality	Minor / Informative
Location	Treasury/Treasury.sol#L48 ProxyReferral/ProxyReferral.sol#L370
Status	Acknowledged

Description

The contract admin has the authority to claim all the balance of the contract. The admin may take advantage of it by calling the `withdrawAll` function.

```
function withdrawAll(address token) external onlyAdmin {
        SafeERC20Upgradeable.safeTransfer(
            IERC20Upgradeable(token),
            msg.sender,
            IERC20Upgradeable(token).balanceOf(address(this))
        );
    }
```

Recommendation

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

Temporary Solutions:

These measurements do not decrease the severity of the finding

- Introduce a time-locker mechanism with a reasonable delay.
- Introduce a multi-signature wallet so that many addresses will confirm the action.
- Introduce a governance model where users will vote about the actions.

Permanent Solution:

- Renouncing the ownership, which will eliminate the threats but it is non-reversible.

Team Update

The team has acknowledged that this is not a security issue and states:

For managing treasury assets and the distribution of referral CAPA tokens, we plan to implement a Governance model. Initially, a Multi-signature wallet will be utilized for the administration wallet.

UAT - Unused Accumulated Tokens

Criticality	Minor / Informative
Location	StakingManager/StakingManager.sol#L120
Status	Acknowledged

Description

The StakingManager contract holds a `tempVaultTax` value of tokens, where 1% of these tokens are sent to the `tempVault` contract during the execution of the `deltaEventDeduction` function. However, a critical observation in the contract's design is that the remaining portion of the tokens, calculated by the `tempVaultTax` variable, is not utilized in any other way. This raises concerns about the efficient use of funds within the `StakingManager` contract. The accumulation of unutilized tokens could lead to an inefficient allocation of resources and potential confusion about the contract's intended token flow and economics.

```
        if (block.timestamp > ((stakingDays * Constants.DAY) +
creationTime)) {
            cakePanda.transfer(
                msg.sender,
                (amount * (10000 - tempVaultTax)) / 10000
            );
            emit UnStake(msg.sender, amount, tempVaultTax);
        } else {
            cakePanda.transfer(
                msg.sender,
                (amount * (10000 - (taxBurn + tempVaultTax))) / 10000
            );
            cakePanda.burn((amount * taxBurn) / 10000); // tax burn
            emit UnStake(msg.sender, amount, taxBurn + tempVaultTax);
        }
```

Recommendation

It is recommended to reconsider the intended functionality of the contract with regards to the unutilized token surplus. If the retention of these tokens within the contract is not

serving any specific purpose, it may be more effective to reallocate them. Alternatively, if there is an intended future use for these tokens, this should be clearly documented to provide clarity on the contract's long-term strategy for token management. Ensuring that all aspects of token flow are purposeful and transparent is crucial for maintaining trust and efficiency in the contract's operations.

Team Update

The team has acknowledged that this is not a security issue and states:

Staked tax tokens are being used to deducting 1% tax at each delta event through deltaDeducation function

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	Treasury.sol#L18,19
Status	Acknowledged

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 _contractsManager
address _contractV1Manager
```

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.

Team Update

The team has acknowledged that this is not a security issue.

L19 - Stable Compiler Version

Criticality	Minor / Informative
Location	Constants.sol#L2
Status	Acknowledged

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 ^0.8.0;
```

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.

Team Update

The team has acknowledged that this is not a security issue.

Functions Analysis

Contract	Type	Bases		
	Function Name	**Visibility**	**Mutability**	**Modifiers**
Constants	Library			
WithdrawalManager	Implementation	Initializable		
	initialize	Public	✓	initializer
	harvest	External	✓	-
	harvestOtherAsset	External	✓	-
	harvestSeasonReward	External	✓	-
	harvest	External	✓	onlyStakingOrRelaunch
	harvestOtherAsset	External	✓	onlyStakingOrRelaunch
	harvestSeasonReward	External	✓	onlyStakingOrRelaunch
	_harvest	Internal	✓	
	_distributeHarvestReward	Internal	✓	
	_harvestOtherAsset	Internal	✓	
	_distributeHarvestOtherAssetReward	Internal	✓	
	_harvestSeasonReward	Internal	✓	
	_distributeHarvestSeasonReward	Internal	✓	
	addReward	External	✓	onlyPermanentVaultAndPermanentVaultManager

	addOtherAssetReward	External	✓	onlyOtherAsset
	addSeasonReward	External	✓	onlyPermanentVaultAndPermanentVaultManager
	calculateReward	Public		-
	calculateOtherAssetReward	Public		-
	calculateSeasonReward	Public		-
	updateDelimiter	External	✓	-
	updateLiquidityRewardType	External	✓	onlyAdmin
	getOtherAssetAddress	Internal		
	getTokenDistributedAtSnapshot	Internal		
TriggerManager	Implementation	Initializable		
	initialize	Public	✓	initializer
	addWhiteListedAddress	Public	✓	onlyAdmin
	_addWhiteListedAddress	Internal	✓	validValue
	removeWhiteListedAddress	Public	✓	onlyAdmin
	_removeWhiteListedAddress	Internal	✓	validValue
	toggleTrigger	Public	✓	onlyAdmin validValue
	getFlagWhitelistedAddress	Public		validValue
	triggerStatus	Public		validValue
	batchWhitelisting	External	✓	onlyAdmin validValue
	removeBatchWhitelisting	External	✓	onlyAdmin validValue

Treasury	Implementation	Initializable		
	initialize	Public	✓	initializer
	transfer	External	✓	onlyPermanentVault
	withdrawAll	External	✓	onlyAdmin
	multiSenderToken	External	✓	-
RelaunchableToken	Implementation	ERC20SnapshotUpgradeable		
	_relaunch	Internal	✓	
	_isRelaunchActive	Internal		
	balanceOf	Public		-
	_beforeTokenTransfer	Internal	✓	
CakePanda	Implementation	RelaunchableToken		
		Public	✓	-
	initialize	Public	✓	initializer
	resetCycle	External	✓	-
	decimals	Public		-
	transfer	Public	✓	-
	transferFrom	Public	✓	-
	_penaltyCheck	Internal	✓	
	penaltyCheck	Public	✓	onlyPenaltyManager
	burn	External	✓	-

	burn	External	✓	onlyPenaltyManager
	snapshot	External	✓	onlyTriggerContracts
	getCurrentSnapshotId	External		-
	viewPenaltyActive	External		-
	updateLastRecycleTime	External	✓	onlyPenaltyManager
	relaunch	External	✓	onlyRelaunchManager
	isRelaunchActive	External		-
	updateTempTax	External	✓	onlyAdmin
	start	External	✓	onlyRelaunchManager
	getDayVariable	External		-
	_resetCycleTimeAndPenalty	Internal	✓	
	_referralReward	Internal	✓	
ERC20Upgradeable	Implementation	Initializable, ContextUpgradeable, IERC20Upgradeable, IERC20MetadataUpgradeable		
	__ERC20_init	Internal	✓	onlyInitializing
	__ERC20_init_unchained	Internal	✓	onlyInitializing
	name	Public		-
	symbol	Public		-
	decimals	Public		-
	totalSupply	Public		-

	balanceOf	Public		-
	transfer	Public	✓	-
	allowance	Public		-
	approve	Public	✓	-
	transferFrom	Public	✓	-
	increaseAllowance	Public	✓	-
	decreaseAllowance	Public	✓	-
	_transfer	Internal	✓	
	_mint	Internal	✓	
	_burn	Internal	✓	
	_approve	Internal	✓	
	_spendAllowance	Internal	✓	
	_beforeTokenTransfer	Internal	✓	
	_afterTokenTransfer	Internal	✓	
ERC20SnapshotUpgradeable	Implementation	Initializable, ERC20Upgradeable		
	__ERC20Snapshot_init	Internal	✓	onlyInitializing
	__ERC20Snapshot_init_unchained	Internal	✓	onlyInitializing
	_snapshot	Internal	✓	
	_getCurrentSnapshotId	Internal		
	balanceOfAt	Public		-
	totalSupplyAt	Public		-
	_beforeTokenTransfer	Internal	✓	

	_valueAt	Private		
	_updateAccountSnapshot	Private	✓	
	_updateTotalSupplySnapshot	Private	✓	
	_updateSnapshot	Private	✓	
	_lastSnapshotId	Private		
TempVault	Implementation	Initializable		
	initialize	Public	✓	initializer
	grabFireBites	External	✓	onlyWhiteListed
	updateMinLimit	External	✓	onlyAdmin
	checkMinimumLimit	Public		-
	updatePercentages	External	✓	onlyAdmin
StakingManager	Implementation	Initializable		
	initialize	Public	✓	initializer
	stake	External	✓	-
	unStake	External	✓	-
	unStakeFinalAmount	Public		-
	deltaEventDeduction	External	✓	onlyPermanentVault
	stakeAmount	Public		-
	forceUnStake	External	✓	onlyWhiteListed
	deltaTax	External		-
	updateTaxBurn	External	✓	onlyAdmin

	updateCreationTime	External	✓	onlyRelaunchManager
	updateStakingDays	External	✓	onlyAdmin
	isForceUnStakeAvailable	External		-
	forceUnStakeReward	External		-
	start	External	✓	onlyRelaunchManager
	getDayVariable	External		-
RoleManager	Implementation	AccessControlEnumerable		
		Public	✓	-
	isAdmin	Public		-
IRoleManager	Interface			
	isAdmin	External	✓	-
Relaunch	Implementation	Initializable		
	initialize	Public	✓	initializer
	relaunchEvent	External	✓	-
	start	External	✓	onlyAdmin
	liquidityReward	Internal	✓	
ProxyReferral	Implementation	Initializable		
	initialize	Public	✓	initializer

	exchangeToken	External	✓	-
	_referral1	Internal	✓	
	_referral2	Internal	✓	
	getReferral	External		-
	getRefererAddress	External		-
	updateAmount	Public	✓	onlyAdmin
	changeReferralProgram	Public	✓	onlyAdmin
	changeReferral1Address	Public	✓	onlyAdmin notZeroAddress
	changeReferral1RewardToken	Public	✓	onlyAdmin notZeroAddress
	changeReferral1RewardPercentage	Public	✓	onlyAdmin
	changeReferral2RewardToken	Public	✓	onlyAdmin notZeroAddress
	changeReferral2RewardPercentage	Public	✓	onlyAdmin
	toggleIsReferralAddressWhiteList	Public	✓	onlyAdmin
	batchReferralWhitelisting	External	✓	onlyAdmin
	eachTransactionReward	External	✓	onlyToken
	withdrawAll	External	✓	onlyAdmin
	updateMegaRewardPercentage	External	✓	onlyAdmin
PermanentVaultManager	Implementation			
		Public	✓	-
	withdrawalFunds	External	✓	onlyRelaunchManager
	afterRelaunchCakeShare	Public		-

	cakeShareReward	External		-
PCSCakePoolStrategy	Implementation	IStrategy		
		Public	✓	-
	stake	External	✓	-
	unstake	External	✓	-
PermanentVault	Implementation	Initializable		
	initialize	Public	✓	initializer
	deltaEvent	External	✓	onlyWhiteListed
	cakeCrumb	Public		-
	currentCrumb	External		-
	updateTreasuryPercentage	Public	✓	onlyAdmin
	updateDeltaRewardTokenAddress	External	✓	onlyAdmin notZeroAddress
	cakeShareRewardAfterRelaunch	External		-
	getIndexOfDeltaRewardTokenAddress	External		-
	getDeltaRewardTokens	External		-
	getDeltaRewardPercentage	External		-
	deltaTriggerTime	External		-
	resetDeltaEventCount	External	✓	onlyRelaunchManager
	start	External	✓	onlyRelaunchManager
	getDayVariable	External		-

PenaltyManager	Implementation	Initializable		
	initialize	Public	✓	initializer
	triggerPenalty	Public	✓	onlyWhiteListed
	triggerPenaltyByToken	External	✓	onlyToken
	_triggerPenalty	Internal	✓	
	addPenaltyUser	External	✓	onlyToken
	getPenaltyCount	External		-
	getPenaltyReward	External		-
	updateIsWhiteList	External	✓	onlyAdmin
	batchWhitelisting	External	✓	onlyAdmin
	checkWhiteList	External		-
	updatePenaltyActive	External	✓	onlyToken
	updatePenalty1	External	✓	onlyAdmin
	updatePenalty2	External	✓	onlyAdmin
	updatePenalty3	External	✓	onlyAdmin
	updatePenalty4	External	✓	onlyAdmin
	resetPenalty	External	✓	onlyToken
OtherAsset	Implementation	Initializable		
	initialize	Public	✓	initializer
	buyTokens	External	✓	onlyConfigurableDistributor
	sessionTrigger	External	✓	onlyWhiteListed

	sessionTriggerTime	External		-
	updateOtherAssetTokenAddress	External	✓	onlyAdmin notZeroAddress
	getIndexOfOtherAssetRewardTokens	External		-
	getOtherAssetRewardTokens	External		-
	start	External	✓	onlyRelaunchManager
	getDayVariable	External		-
MasterChefContract	Implementation	OwnableUpgradeable		
	initialize	Public	✓	initializer
	createPool	External	✓	-
	stake	External	✓	-
	unStake	External	✓	-
	harvestRewards	Public	✓	-
	_harvestRewards	Internal	✓	
	updatePoolRewards	Private	✓	
	isParticipated	External		-
	poolCount	External		-
	poolTotalStaked	External		-
	getPoolStakedAmount	External		-
	getUserRewardTaken	External		-
	getPendingRewards	External		-

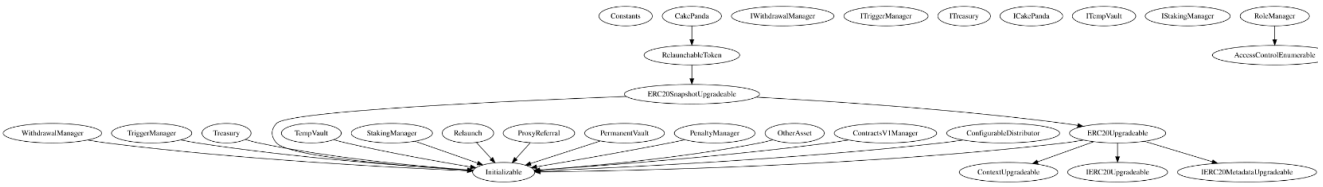
ContractsV1Manager	Implementation	Initializable		
	initialize	Public	✓	initializer
	updateTriggerManager	Public	✓	onlyAdmin notZeroAddress
	updateTreasury	Public	✓	onlyAdmin notZeroAddress
	updateStrategy	Public	✓	onlyAdmin notZeroAddress
	updatePrimaryPair	Public	✓	onlyAdmin notZeroAddress
	updateProxyReferral	Public	✓	onlyAdmin notZeroAddress
	updateMasterChef	Public	✓	onlyAdmin notZeroAddress
ContractsManager	Implementation			
		Public	✓	-
	updateToken	Public	✓	onlyAdmin notZeroAddress
	updatePenaltyManager	Public	✓	onlyAdmin notZeroAddress
	updateRoleManager	Public	✓	onlyAdmin notZeroAddress
	updateTempVault	Public	✓	onlyAdmin notZeroAddress
	updatePermanentVault	Public	✓	onlyAdmin notZeroAddress
	updatePermanentVaultManager	Public	✓	onlyAdmin notZeroAddress
	updateConfigurableDistributor	Public	✓	onlyAdmin notZeroAddress
	updateCake	Public	✓	onlyAdmin notZeroAddress

	updateCakePool	Public	✓	onlyAdmin notZeroAddress
	updateWithdrawalManager	Public	✓	onlyAdmin notZeroAddress
	updateStakingManager	Public	✓	onlyAdmin notZeroAddress
	updateRelaunchManager	Public	✓	onlyAdmin notZeroAddress
	updatePcsRouter	Public	✓	onlyAdmin notZeroAddress
	updateBusd	Public	✓	onlyAdmin notZeroAddress
	updateWeth	Public	✓	onlyAdmin notZeroAddress
ConfigurableDistributor	Implementation	Initializable		
	initialize	Public	✓	initializer
	addLiquidity	External	✓	-
	sendToAssets	Internal	✓	
	updateMarketingWallet	External	✓	onlyAdmin notZeroAddress
	updateOtherAsset	External	✓	onlyAdmin notZeroAddress
	updateReferralWallet	External	✓	onlyAdminOrProxyReferral notZeroAddress
	updateMarketingWalletPercentage	External	✓	onlyAdmin
	updateOtherAssetPercentage	External	✓	onlyAdmin
	updateReferralWalletPercentage	External	✓	onlyAdmin
	updateLiquidityTokenAddress	External	✓	onlyAdmin notZeroAddress

Busd	Implementation	ERC20		
		Public	✓	ERC20
	decimals	Public		-

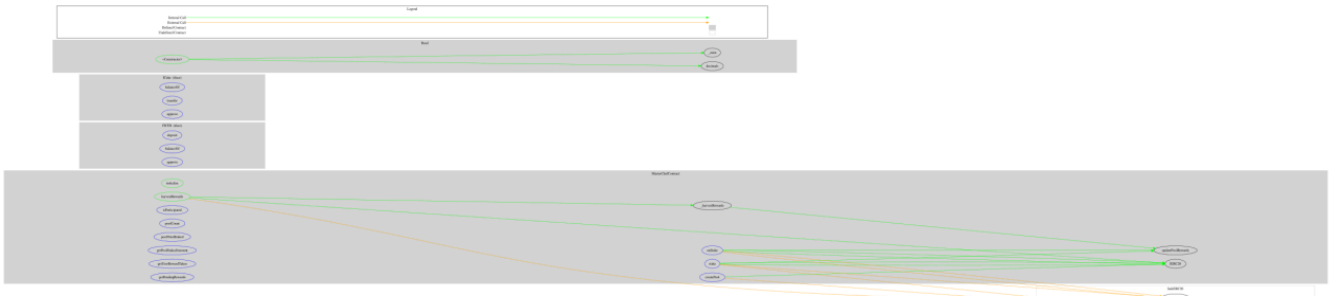
Inheritance Graph

See the detailed image in the github repository.



Flow Graph

See the detailed image in the github repository.



Summary

Cake Panda contract implements a decentralized application. This audit investigates security issues, business logic concerns and potential improvements.

Disclaimer

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Blockchain technology and cryptographic assets present a high level of ongoing risk Cyberscope's position is that each company and individual are responsible for their own due diligence and continuous security Cyberscope's goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies and in no way claims any guarantee of security or functionality of the technology we agree to analyze. The assessment services provided by Cyberscope are subject to dependencies and are under continuing development. You agree that your access and/or use including but not limited to any services reports and materials will be at your sole risk on an as-is where-is and as-available basis Cryptographic tokens are emergent technologies and carry with them high levels of technical risk and uncertainty. The assessment reports could include false positives false negatives and other unpredictable results. The services may access and depend upon multiple layers of third parties.

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Cyberscope is a blockchain cybersecurity company that was founded with the vision to make web3.0 a safer place for investors and developers. Since its launch, it has worked with thousands of projects and is estimated to have secured tens of millions of investors' funds.

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