



Cyberscope

Audit Report

ProfitPIG

July 2023

Network BSC

Address 0x806674e94fbd7e50752ea0e97b2041fa72d5d000

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Analysis

● Critical ● Medium ● Minor / Informative ● Pass

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

Diagnostics

● Critical ● Medium ● Minor / Informative

Severity	Code	Description	Status
●	FSA	Fixed Swap Address	Unresolved
●	RSW	Redundant Storage Writes	Unresolved
●	RSML	Redundant SafeMath Library	Unresolved
●	IDI	Immutable Declaration Improvement	Unresolved
●	L04	Conformance to Solidity Naming Conventions	Unresolved
●	L07	Missing Events Arithmetic	Unresolved
●	L09	Dead Code Elimination	Unresolved
●	L16	Validate Variable Setters	Unresolved
●	L17	Usage of Solidity Assembly	Unresolved
●	L20	Succeeded Transfer Check	Unresolved

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Review

Contract Name	ProfitPIG
Compiler Version	v0.8.0+commit.c7dfd78e
Optimization	200 runs
Explorer	https://bscscan.com/address/0x806674e94fbd7e50752ea0e97b2041fa72d5d000
Address	0x806674e94fbd7e50752ea0e97b2041fa72d5d000
Network	BSC
Symbol	PIG
Decimals	18
Total Supply	100,000,000

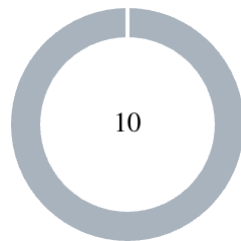
Audit Updates

Initial Audit	07 Jul 2023
Corrected Phase 2	09 Jul 2023

Source Files

Filename	SHA256
ProfitPIG.sol	252d6c0c518b941f0fd95732292cebccff08f008568bebf5a3060acd63633a11

Findings Breakdown



● Critical	0
● Medium	0
● Minor / Informative	10

Severity	Unresolved	Acknowledged	Resolved	Other
● Critical	0	0	0	0
● Medium	0	0	0	0
● Minor / Informative	10	0	0	0

FSA - Fixed Swap Address

Criticality	Minor / Informative
Location	contracts/ProfitPig.sol#L1076,1077
Status	Acknowledged

Description

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

```
router = IUniswapV2Router02(router_);  
pair = IUniswapV2Factory(router.factory()).createPair(  
    address(this),  
    router.WETH()  
);
```

Recommendation

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

Team Update

Target Router is not an upgradeable proxy:

<https://bscscan.com/address/0x10ed43c718714eb63d5aa57b78b54704e256024e#code>

and most DEX's like Uniswap and Pancakeswap are releasing new versions (e.g. V3) instead of modifying V2. Very unlikely requirement.

RSW - Redundant Storage Writes

Criticality	Minor / Informative
Location	contracts/ProfitPig.sol#L1104,1108,1369
Status	Acknowledged

Description

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

The contract modifies the state of certain variables event when their current state matches the provided argument. As a result, the contract performs redundant storage writes.

```
TWAP = _twap;  
feesActive = true;  
isFeeExempt[holder] = true;
```

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.

Team Update

Functions present to modify state only, current state will not match provided arguments

RSML - Redundant SafeMath Library

Criticality	Minor / Informative
Location	ProfitPIG.sol
Status	Acknowledged

Description

SafeMath is a popular Solidity library that provides a set of functions for performing common arithmetic operations in a way that is resistant to integer overflows and underflows.

Starting with Solidity versions that are greater than or equal to 0.8.0, the arithmetic operations revert to underflow and overflow. As a result, the native functionality of the Solidity operations replaces the SafeMath library. Hence, the usage of the SafeMath library adds complexity, overhead and increases gas consumption unnecessarily.

```
library SafeMath {...}
```

Recommendation

The team is advised to remove the SafeMath library. Since the version of the contract is greater than `0.8.0` then the pure Solidity arithmetic operations produce the same result.

If the previous functionality is required, then the contract could exploit the `unchecked { ... }` statement.

Read more about the breaking change on

<https://docs.soliditylang.org/en/v0.8.16/080-breaking-changes.html#solidity-v0-8-0-breaking-changes>.

Team Update

Requires re-work and regression test simply for gas savings which team are not allocating time to.

IDI - Immutable Declaration Improvement

Criticality	Minor / Informative
Location	ProfitPIG.sol#L1076,1077,1078,1080,1081,1082,1087,1089,1090
Status	Acknowledged

Description

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

```
_name  
_symbol  
_totalSupply  
rewardToken  
router  
pair  
distributor  
distributorGas  
swapThreshold
```

Recommendation

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

L04 - Conformance to Solidity Naming Conventions

Criticality	Minor / Informative
Location	ProfitPIG.sol#L472,796,847,848,1015,1016,1029,1030,1031,1032,1033,1037,1108
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.

```
function WETH() external pure returns (address);
address public _token
uint256 _minPeriod
uint256 _minDistribution
address public TWAP
uint8 private constant _decimals = 18
uint256 public constant liquidityFee = 4
uint256 public constant buybackFee = 4
uint256 public constant reflectionFee = 4
uint256 public constant totalFee = 12
uint256 public constant feeDenominator = 100
uint256 public constant minBuybackThreshold = 2 * 10 ** 18
address _twap
```

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	ProfitPIG.sol#L850
Status	Acknowledged

Description

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

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

```
minPeriod = _minPeriod
```

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.

L09 - Dead Code Elimination

Criticality	Minor / Informative
Location	ProfitPIG.sol#L247,275,300,310,329,343,362,372,389,399,416,1327
Status	Acknowledged

Description

In Solidity, dead code is code that is written in the contract, but is never executed or reached during normal contract execution. Dead code can occur for a variety of reasons, such as:

- Conditional statements that are always false.
- Functions that are never called.
- Unreachable code (e.g., code that follows a return statement).

Dead code can make a contract more difficult to understand and maintain, and can also increase the size of the contract and the cost of deploying and interacting with it.

```
function isContract(address account) internal view returns (bool) {
    // This method relies on extcodesize, which returns 0 for contracts in
    // construction, since the code is only stored at the end of the
    // constructor execution.

    uint256 size;
    assembly {
        size := extcodesize(account)
    }
    return size > 0;
}

...
```

Recommendation

To avoid creating dead code, it's important to carefully consider the logic and flow of the contract and to remove any code that is not needed or that is never executed. This can help improve the clarity and efficiency of the contract.

Team Update

Inherited code from existing audited contract, not authored by us. Not implementing due to backward compatibility risk and regression test requirement etc.

L16 - Validate Variable Setters

Criticality	Minor / Informative
Location	ProfitPIG.sol#L768,1080,1110
Status	Acknowledged

Description

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

```
owner = adr  
rewardToken = rewardToken_  
TWAP = _twap
```

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.

L17 - Usage of Solidity Assembly

Criticality	Minor / Informative
Location	ProfitPIG.sol#L253,428
Status	Acknowledged

Description

Using assembly can be useful for optimizing code, but it can also be error-prone. It's important to carefully test and debug assembly code to ensure that it is correct and does not contain any errors.

Some common types of errors that can occur when using assembly in Solidity include Syntax, Type, Out-of-bounds, Stack, and Revert.

```
assembly {  
    size := extcodesize(account)  
}  
  
assembly {  
    let returndata_size := mload(returndata)  
    revert(add(32, returndata), returndata_size)  
}
```

Recommendation

It is recommended to use assembly sparingly and only when necessary, as it can be difficult to read and understand compared to Solidity code.

Team Update

Inherited code from existing audited contract, not authored by us. Not implementing due to backward compatibility risk and regression test requirement etc.

L20 - Succeeded Transfer Check

Criticality	Minor / Informative
Location	ProfitPIG.sol#L943
Status	Acknowledged

Description

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

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

Recommendation

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

Team Update

Inherited code from existing audited contract, not authored by us. Not implementing due to backward compatibility risk and regression test requirement etc.

Functions Analysis

Contract	Type	Bases		
	Function Name	Visibility	Mutability	Modifiers
SafeMath	Library			
	tryAdd	Internal		
	trySub	Internal		
	tryMul	Internal		
	tryDiv	Internal		
	tryMod	Internal		
	add	Internal		
	sub	Internal		
	mul	Internal		
	div	Internal		
	mod	Internal		
	sub	Internal		
	div	Internal		
	mod	Internal		
Address	Library			
	isContract	Internal		
	sendValue	Internal	✓	
	functionCall	Internal	✓	

	functionCall	Internal	✓	
	functionCallWithValue	Internal	✓	
	functionCallWithValue	Internal	✓	
	functionStaticCall	Internal		
	functionStaticCall	Internal		
	functionDelegateCall	Internal	✓	
	functionDelegateCall	Internal	✓	
	verifyCallResult	Internal		
IUniswapV2Factory	Interface			
	feeTo	External		-
	feeToSetter	External		-
	getPair	External		-
	allPairs	External		-
	allPairsLength	External		-
	createPair	External	✓	-
	setFeeTo	External	✓	-
	setFeeToSetter	External	✓	-
IUniswapV2Router01	Interface			
	factory	External		-
	WETH	External		-
	addLiquidity	External	✓	-

	addLiquidityETH	External	Payable	-
	removeLiquidity	External	✓	-
	removeLiquidityETH	External	✓	-
	removeLiquidityWithPermit	External	✓	-
	removeLiquidityETHWithPermit	External	✓	-
	swapExactTokensForTokens	External	✓	-
	swapTokensForExactTokens	External	✓	-
	swapExactETHForTokens	External	Payable	-
	swapTokensForExactETH	External	✓	-
	swapExactTokensForETH	External	✓	-
	swapETHForExactTokens	External	Payable	-
	quote	External		-
	getAmountOut	External		-
	getAmountIn	External		-
	getAmountsOut	External		-
	getAmountsIn	External		-
IUniswapV2Router02	Interface	IUniswapV2Router01		
	removeLiquidityETHSupportingFeeOnTransferTokens	External	✓	-
	removeLiquidityETHWithPermitSupportingFeeOnTransferTokens	External	✓	-
	swapExactTokensForTokensSupportingFeeOnTransferTokens	External	✓	-
	swapExactETHForTokensSupportingFeeOnTransferTokens	External	Payable	-

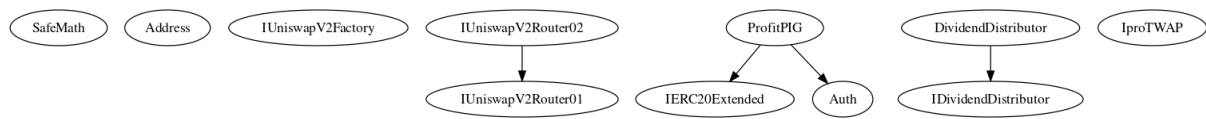
	swapExactTokensForETHSupportingFeeOnTransferTokens	External	✓	-
IERC20Extended	Interface			
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	balanceOf	External		-
	transfer	External	✓	-
	allowance	External		-
	approve	External	✓	-
	transferFrom	External	✓	-
Auth	Implementation			
		Public	✓	-
	authorize	Public	✓	onlyOwner
	unauthorize	Public	✓	onlyOwner
	isOwner	Public		-
	isAuthorized	Public		-
	transferOwnership	Public	✓	onlyOwner
	renounceOwnership	Public	✓	onlyOwner
IDividendDistributor	Interface			

	setDistributionCriteria	External	✓	-
	setShare	External	✓	-
	deposit	External	Payable	-
	process	External	✓	-
DividendDistributor	Implementation	IDividendDistributor		
		Public	✓	-
	setDistributionCriteria	External	✓	onlyToken
	setShare	External	✓	onlyToken
	deposit	External	Payable	onlyToken
	process	External	✓	onlyToken
	shouldDistribute	Internal		
	distributeDividend	Internal	✓	
	claimDividend	External	✓	-
	getUnpaidEarnings	Public		-
	getCumulativeDividends	Internal		
	addShareholder	Internal	✓	
	removeShareholder	Internal	✓	
IproTWAP	Interface			
	update	External	✓	-
	consult	External		-

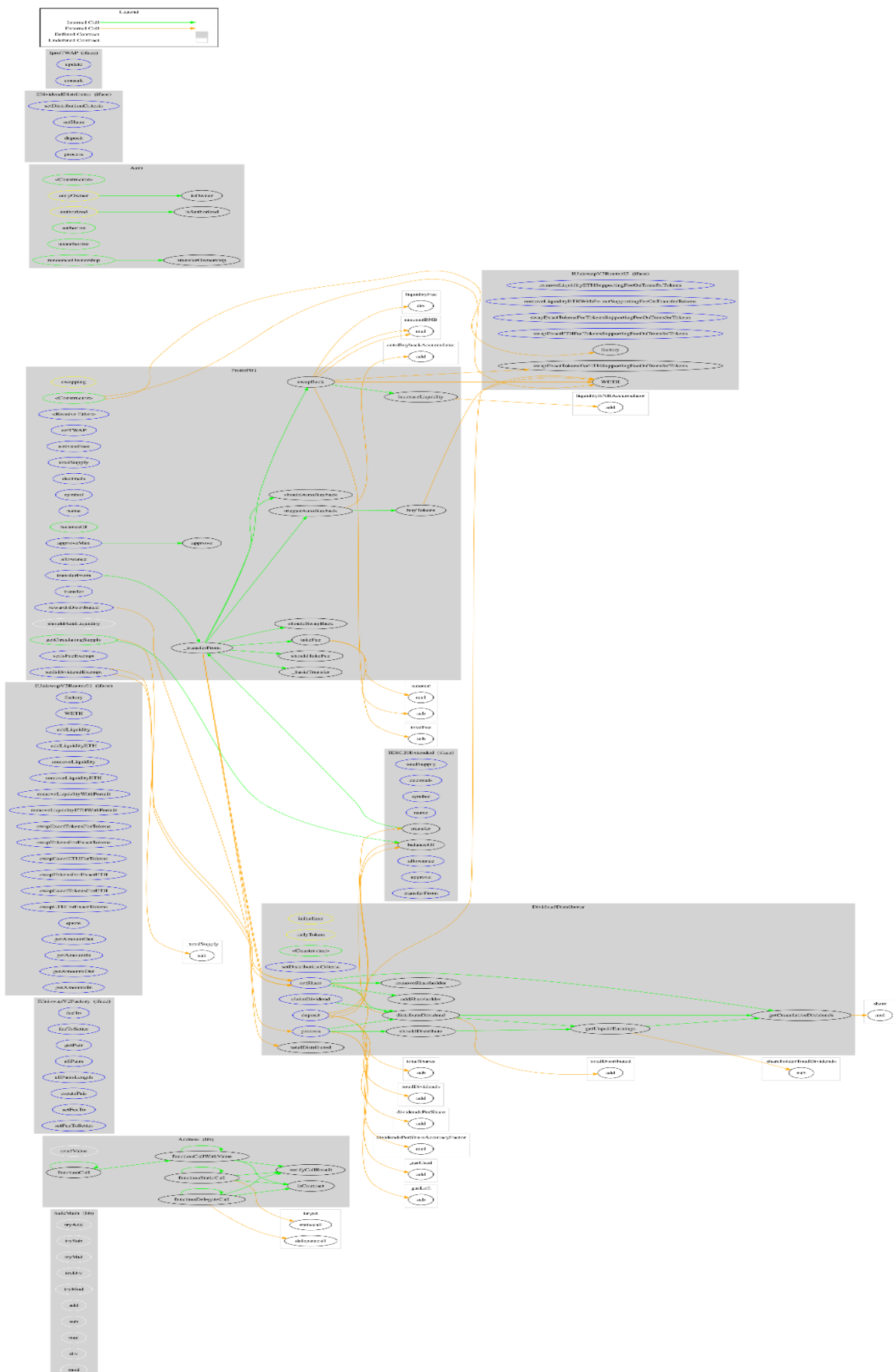
ProfitPIG	Implementation	IERC20Extended, Auth		
		Public	Payable	Auth
		External	Payable	-
	setTWAP	External	✓	onlyOwner
	activateFees	External	✓	onlyOwner
	totalSupply	External		-
	decimals	External		-
	symbol	External		-
	name	External		-
	balanceOf	Public		-
	rewardsDistributed	External		-
	allowance	External		-
	approve	Public	✓	-
	approveMax	External	✓	-
	transfer	External	✓	-
	transferFrom	External	✓	-
	_transferFrom	Internal	✓	
	_basicTransfer	Internal	✓	
	shouldTakeFee	Internal		
	takeFee	Internal	✓	
	shouldSwapBack	Internal		
	swapBack	Internal	✓	swapping
	shouldAddLiquidity	Internal		

	increaseLiquidity	Internal	✓	
	shouldAutoBuyback	Internal		
	triggerAutoBuyback	Internal	✓	
	buyTokens	Internal	✓	swapping
	setIsDividendExempt	External	✓	authorized
	setIsFeeExempt	External	✓	authorized
	getCirculatingSupply	Public		-

Inheritance Graph



Flow Graph



Summary

ProfitPIG contract implements a token mechanism. This audit investigates security issues, business logic concerns and potential improvements. ProfitPIG is an interesting project that has a friendly and growing community. The Smart Contract analysis reported no compiler errors. The contract Owner can access some admin functions that can not be used in a malicious way to disturb the users' transactions. There is also a fixed amount of 12% sell fees.

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



The Cyberscope team

<https://www.cyberscope.io>