Agave

Smart Contract Audit Report

SYSFIXED

09 Oct 2021

TABLE OF CONTENTS

AUDITED DETAILS

Audited Project

Project name	Token ticker	Blockchain
Agave	AGVE	Arbitrum

Addresses

Contract address	0x848e0ba28b637e8490d88bae51fa99c87116409b
Contract deployer address	0xdec0DED0606B7d0560ADEBD6C3a919a671dB4D66

Project Website

https://agave.finance/

Codebase

https://arbiscan.io/address/0x848e0ba28b637e8490d88bae51fa99c87116409b#code

SUMMARY

Agave is a decentralized non-custodial money market protocol where users can participate as depositors or borrowers. It is a fork of Aave protocol-v2, deployed on xDAI, and is being developed by active members of the 1hive community.

Contract Summary

Documentation Quality

Agave provides a very good documentation with standard of solidity base code.

- The technical description is provided clearly and structured and also dont have any high risk issue.

Code Quality

The Overall quality of the basecode is standard.

- Standard solidity basecode and rules are already followed by Agave with the discovery of several low issues.

Test Coverage

Test coverage of the project is 100% (Through Codebase)

Audit Findings Summary

- SWC-101 | It is recommended to use vetted safe math libraries for arithmetic operations consistently on lines 45, 45, 56, 56, 56, 96, 101, 102, 156, 671, 683, 1056, 1281, 1346, 1347, 1409, 1411, 1430, 1432, 1623, 1635, 101, 102 and 156.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 8, 19, 64, 112, 164, 282, 308, 527, 611, 711, 748, 785, 979, 992 and 1585.
- SWC-110 SWC-123 | It is recommended to use of revert(), assert(), and require() in Solidity, and the new REVERT opcode in the EVM on lines 93, 101, 137, 156 and 1057.

CONCLUSION

We have audited the Agave project released in October 2022 to discover issues and identify potential security vulnerabilities in Agave Project. This process is used to find technical issues and security loopholes which might be found in the smart contract.

The security audit report provides satisfactory results with low-risk issues.

The issues found in the Agave smart contract code do not pose a considerable risk. The writing of the contract is close to the standard of writing contracts in general. The low-risk issues found are some arithmetic operation issues, a floating pragma is set, and out-of-bounds array access which the index access expression can cause an exception in case an invalid array index value is used.

AUDIT RESULT

Article	Category	Description	Result
Default Visibility	SWC-100 SWC-108	Functions and state variables visibility should be set explicitly. Visibility levels should be specified consciously.	PASS
Integer Overflow and Underflow	SWC-101	If unchecked math is used, all math operations should be safe from overflows and underflows.	ISSUE FOUND
Outdated Compiler Version	SWC-102	It is recommended to use a recent version of the Solidity compiler.	PASS
Floating Pragma	SWC-103	Contracts should be deployed with the same compiler version and flags that they have been tested thoroughly.	ISSUE FOUND
Unchecked Call Return Value	SWC-104	The return value of a message call should be checked.	PASS
Unprotected Ether Withdrawal	SWC-105	Due to missing or insufficient access controls, malicious parties can withdraw from the contract.	PASS
SELFDESTRUCT Instruction	SWC-106	The contract should not be self-destructible while it has funds belonging to users.	PASS
Reentrancy	SWC-107	Check effect interaction pattern should be followed if the code performs recursive call.	PASS
Uninitialized Storage Pointer	SWC-109	Uninitialized local storage variables can point to unexpected storage locations in the contract.	PASS
Assert Violation	SWC-110 SWC-123	Properly functioning code should never reach a failing assert statement.	ISSUE FOUND
Deprecated Solidity Functions	SWC-111	Deprecated built-in functions should never be used.	PASS
Delegate call to Untrusted Callee	SWC-112	Delegatecalls should only be allowed to trusted addresses.	PASS

DoS (Denial of Service)	SWC-113 SWC-128	Execution of the code should never be blocked by a specific contract state unless required.	PASS
Race Conditions	SWC-114	Race Conditions and Transactions Order Dependency should not be possible.	PASS
Authorization through tx.origin	SWC-115	tx.origin should not be used for authorization.	PASS
Block values as a proxy for time	SWC-116	Block numbers should not be used for time calculations.	PASS
Signature Unique ID	SWC-117 SWC-121 SWC-122	Signed messages should always have a unique id. A transaction hash should not be used as a unique id.	PASS
Incorrect Constructor Name	SWC-118	Constructors are special functions that are called only once during the contract creation.	PASS
Shadowing State Variable	SWC-119	State variables should not be shadowed.	PASS
Weak Sources of Randomness	SWC-120	Random values should never be generated from Chain Attributes or be predictable.	PASS
Write to Arbitrary Storage Location	SWC-124	The contract is responsible for ensuring that only authorized user or contract accounts may write to sensitive storage locations.	PASS
Incorrect Inheritance Order	SWC-125	When inheriting multiple contracts, especially if they have identical functions, a developer should carefully specify inheritance in the correct order. The rule of thumb is to inherit contracts from more /general/ to more /specific/.	PASS
Insufficient Gas Griefing	SWC-126	Insufficient gas griefing attacks can be performed on contracts which accept data and use it in a sub-call on another contract.	PASS
Arbitrary Jump Function	SWC-127	As Solidity doesnt support pointer arithmetics, it is impossible to change such variable to an arbitrary value.	PASS

Typographical Error	SWC-129	A typographical error can occur for example when the intent of a defined operation is to sum a number to a variable.	PASS
Override control character	SWC-130	Malicious actors can use the Right-To-Left-Override unicode character to force RTL text rendering and confuse users as to the real intent of a contract.	PASS
Unused variables	SWC-131 SWC-135	Unused variables are allowed in Solidity and they do not pose a direct security issue.	PASS
Unexpected Ether balance	SWC-132	Contracts can behave erroneously when they strictly assume a specific Ether balance.	PASS
Hash Collisions Variable	SWC-133	Using abi.encodePacked() with multiple variable length arguments can, in certain situations, lead to a hash collision.	PASS
Hardcoded gas amount	SWC-134	The transfer() and send() functions forward a fixed amount of 2300 gas.	PASS
Unencrypted Private Data	SWC-136	It is a common misconception that private type variables cannot be read.	PASS

SMART CONTRACT ANALYSIS

Started	Friday Oct 08 2021 16:31:45 GMT+0000 (Coordinated Universal Time)
Finished	Saturday Oct 09 2021 23:13:33 GMT+0000 (Coordinated Universal Time)
Mode	Standard
Main Source File	ERC777SnapshotWrapper.sol

Detected Issues

ID	Title	Severity	Status
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "/" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "%" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "++" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+=" DISCOVERED	low	acknowledged

SWC-101	ARITHMETIC OPERATION "+=" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-=" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "-" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+=" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "+" DISCOVERED	low	acknowledged
SWC-101	ARITHMETIC OPERATION "++" DISCOVERED	low	acknowledged
SWC-101	COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED	low	acknowledged
SWC-101	COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED	low	acknowledged
SWC-101	COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged

SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-103	A FLOATING PRAGMA IS SET.	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged
SWC-110	OUT OF BOUNDS ARRAY ACCESS	low	acknowledged

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 45

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
44   // (a + b) / 2 can overflow.
45   return (a & b) + (a ^ b) / 2;
46   }
47
48   /**
49
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 45

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
44   // (a + b) / 2 can overflow.
45   return (a & b) + (a ^ b) / 2;
46   }
47
48   /**
49
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 56

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
55   // (a + b - 1) / b can overflow on addition, so we distribute.
56   return a / b + (a % b == 0 ? 0 : 1);
57   }
58   }
59
60
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 56

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
55   // (a + b - 1) / b can overflow on addition, so we distribute.
56   return a / b + (a % b == 0 ? 0 : 1);
57   }
58   }
59
60
```

SWC-101 | ARITHMETIC OPERATION "%" DISCOVERED

LINE 56

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
55   // (a + b - 1) / b can overflow on addition, so we distribute.
56   return a / b + (a % b == 0 ? 0 : 1);
57   }
58   }
59
60
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 96

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
95   } else {
96   low = mid + 1;
97   }
98   }
99
100
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 101

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
100   // At this point `low` is the exclusive upper bound. We will return the inclusive
upper bound.
101   if (low > 0 && array[low - 1] == element) {
102   return low - 1;
103   } else {
104   return low;
105
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 102

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
101   if (low > 0 && array[low - 1] == element) {
102   return low - 1;
103   } else {
104   return low;
105   }
106
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 156

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
155   uint256[] storage ids = _snapshots.ids;
156   return ids.length > 0 ? ids[ids.length - 1] : 0;
157   }
158   }
159
160
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 671

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
670   ) internal {
671   uint256 newAllowance = token.allowance(address(this), spender) + value;
672   _callOptionalReturn(token, abi.encodeWithSelector(token.approve.selector, spender,
newAllowance));
673   }
674
675
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 683

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
682   require(oldAllowance >= value, "SafeERC20: decreased allowance below zero");
683   uint256 newAllowance = oldAllowance - value;
684   _callOptionalReturn(token, abi.encodeWithSelector(token.approve.selector, spender,
newAllowance));
685   }
686   }
687
```

SWC-101 | ARITHMETIC OPERATION "++" DISCOVERED

LINE 1056

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1055   _defaultOperatorsArray = defaultOperators_;
1056   for (uint256 i = 0; i < defaultOperators_.length; i++) {
1057   _defaultOperators[defaultOperators_[i]] = true;
1058   }
1059
1060
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 1281

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1280   require(currentAllowance >= amount, "ERC777: transfer amount exceeds allowance");
1281   _approve(holder, spender, currentAllowance - amount);
1282
1283   _callTokensReceived(spender, holder, recipient, amount, "", "", false);
1284
1285
```

SWC-101 | ARITHMETIC OPERATION "+=" DISCOVERED

LINE 1346

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1345   // Update state variables
1346   _totalSupply += amount;
1347   _balances[account] += amount;
1348
1349   _callTokensReceived(operator, address(0), account, amount, userData, operatorData,
requireReceptionAck);
1350
```

SWC-101 | ARITHMETIC OPERATION "+=" DISCOVERED

LINE 1347

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1346   _totalSupply += amount;
1347   _balances[account] += amount;
1348
1349   _callTokensReceived(operator, address(0), account, amount, userData, operatorData,
requireReceptionAck);
1350
1351
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 1409

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1408   unchecked {
1409   _balances[from] = fromBalance - amount;
1410   }
1411   _totalSupply -= amount;
1412
1413
```

SWC-101 | ARITHMETIC OPERATION "-=" DISCOVERED

LINE 1411

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1410   }
1411   _totalSupply -= amount;
1412
1413   emit Burned(operator, from, amount, data, operatorData);
1414   emit Transfer(from, address(0), amount);
1415
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 1430

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1429   unchecked {
1430   _balances[from] = fromBalance - amount;
1431   }
1432   _balances[to] += amount;
1433
1434
```

SWC-101 | ARITHMETIC OPERATION "+=" DISCOVERED

LINE 1432

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1431   }
1432   _balances[to] += amount;
1433
1434   emit Sent(operator, from, to, amount, userData, operatorData);
1435   emit Transfer(from, to, amount);
1436
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 1623

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1622   require(
1623   _amount + totalSupply() <= backingToken.balanceOf(address(this)),
1624   "W37: Too large mint"
1625   );
1626   _mint(_recipient, _amount, "", "", false);
1627
```

SWC-101 | ARITHMETIC OPERATION "++" DISCOVERED

LINE 1635

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1634   function snapshot() external returns (uint256) {
1635   uint256 currentId = ++currentSnapshotId;
1636   emit Snapshot(currentId);
1637   return currentId;
1638   }
1639
```

SWC-101 | COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED

LINE 101

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
100   // At this point `low` is the exclusive upper bound. We will return the inclusive
upper bound.
101   if (low > 0 && array[low - 1] == element) {
102   return low - 1;
103   } else {
104   return low;
105
```

SWC-101 | COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED

LINE 102

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
101   if (low > 0 && array[low - 1] == element) {
102   return low - 1;
103   } else {
104   return low;
105   }
106
```

SWC-101 | COMPILER-REWRITABLE "<UINT> - 1" DISCOVERED

LINE 156

low SEVERITY

This plugin produces issues to support false positive discovery within mythril.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
155   uint256[] storage ids = _snapshots.ids;
156   return ids.length > 0 ? ids[ids.length - 1] : 0;
157   }
158   }
159
160
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 8

low SEVERITY

The current pragma Solidity directive is ""^0.8.9"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
7
8   pragma solidity ^0.8.9;
9
10   interface ISnapper {
11   function snapshot() external returns (uint256);
12
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 19

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
18
19   pragma solidity ^0.8.0;
20
21   /**
22   * @dev Standard math utilities missing in the Solidity language.
23
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 64

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
63
64   pragma solidity ^0.8.0;
65
66
67   /**
68
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 112

low SEVERITY

The current pragma Solidity directive is ""^0.8.9"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
111
112   pragma solidity ^0.8.9;
113
114
115   /// @author Philippe Dumonet
116
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 164

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
163
164   pragma solidity ^0.8.0;
165
166   /**
167   * @dev Interface of the global ERC1820 Registry, as defined in the
168
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 282

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
281
282   pragma solidity ^0.8.0;
283
284   /**
285   * @dev Provides information about the current execution context, including the
286
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 308

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
307
308   pragma solidity ^0.8.0;
309
310   /**
311   * @dev Collection of functions related to the address type
312
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 527

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
526
527   pragma solidity ^0.8.0;
528
529   /**
530   * @dev Interface of the ERC20 standard as defined in the EIP.
531
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 611

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
610
611   pragma solidity ^0.8.0;
612
613
614
615
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 711

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
710
711   pragma solidity ^0.8.0;
712
713   /**
714   * @dev Interface of the ERC777TokensSender standard as defined in the EIP.
715
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 748

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
747
748   pragma solidity ^0.8.0;
749
750   /**
751   * @dev Interface of the ERC777TokensRecipient standard as defined in the EIP.
752
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 785

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
784
785   pragma solidity ^0.8.0;
786
787   /**
788   * @dev Interface of the ERC777Token standard as defined in the EIP.
789
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 979

low SEVERITY

The current pragma Solidity directive is ""^0.8.9"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
978
979   pragma solidity ^0.8.9;
980
981
982   interface IEasyMinter is IERC777 {
983
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 992

low SEVERITY

The current pragma Solidity directive is ""^0.8.0"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
991
992   pragma solidity ^0.8.0;
993
994
995
996
```

SWC-103 | A FLOATING PRAGMA IS SET.

LINE 1585

low SEVERITY

The current pragma Solidity directive is ""^0.8.9"". It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1584
1585   pragma solidity ^0.8.9;
1586
1587
1588
1589
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 93

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
92   // because Math.average rounds down (it does integer division with truncation).
93   if (array[mid] > element) {
94   high = mid;
95   } else {
96   low = mid + 1;
97
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 101

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
100   // At this point `low` is the exclusive upper bound. We will return the inclusive
upper bound.
101   if (low > 0 && array[low - 1] == element) {
102   return low - 1;
103   } else {
104   return low;
105
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 137

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
136   } else {
137   return (true, _snapshots.values[index]);
138   }
139   }
140
141
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 156

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
155   uint256[] storage ids = _snapshots.ids;
156   return ids.length > 0 ? ids[ids.length - 1] : 0;
157   }
158   }
159
160
```

SWC-110 | OUT OF BOUNDS ARRAY ACCESS

LINE 1057

low SEVERITY

The index access expression can cause an exception in case of use of invalid array index value.

Source File

- ERC777SnapshotWrapper.sol

Locations

```
1056   for (uint256 i = 0; i < defaultOperators_.length; i++) {
1057   _defaultOperators[defaultOperators_[i]] = true;
1058   }
1059
1060   // register interfaces
1061
```

DISCLAIMER

This report is subject to the terms and conditions (including without limitation, description of services, confidentiality, disclaimer and limitation of liability) set forth in the Services Agreement, or the scope of services, and terms and conditions provided to you ("Customer" or the "Company") in connection with the Agreement. This report provided in connection with the Services set forth in the Agreement shall be used by the Company only to the extent permitted under the terms and conditions set forth in the Agreement. This report may not be transmitted, disclosed, referred to, or relied upon by any person for any purposes, nor may copies be delivered to any other person other than the Company, without Sysfixed's prior written consent in each instance.

This report is not, nor should be considered, an "endorsement" or "disapproval" of any particular project or team. This report is not, nor should be considered, an indication of the economics or value of any "product" or "asset" created by any team or project that contracts Sysfixed to perform a security assessment. This report does not provide any warranty or guarantee regarding the absolute bug-free nature of the technology analyzed, nor do they provide any indication of the technologies proprietors, business, business model, or legal compliance.

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

This report should not be used in any way to make decisions around investment or involvement with any particular project. This report in no way provides investment advice, nor should be leveraged as investment advice of any sort. This report represents an extensive assessing process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology.

This report is provided for information purposes only and on a non-reliance basis and does not constitute investment advice. No one shall have any right to rely on the report or its contents, and Sysfixed and its affiliates (including holding companies, shareholders, subsidiaries, employees, directors, officers, and other representatives) (Sysfixed) owe no duty of care.

ABOUT US

Sysfixed is a blockchain security certification organization established in 2021 with the objective to provide smart contract security services and verify their correctness in blockchain-based protocols. Sysfixed automatically scans for security vulnerabilities in Ethereum and other EVM-based blockchain smart contracts. Sysfixed a comprehensive range of analysis techniques—including static analysis, dynamic analysis, and symbolic execution—can accurately detect security vulnerabilities to provide an in-depth analysis report. With a vibrant ecosystem of world-class integration partners that amplify developer productivity, Sysfixed can be utilized in all phases of your project's lifecycle. Our team of security experts is dedicated to the research and improvement of our tools and techniques used to fortify your code.