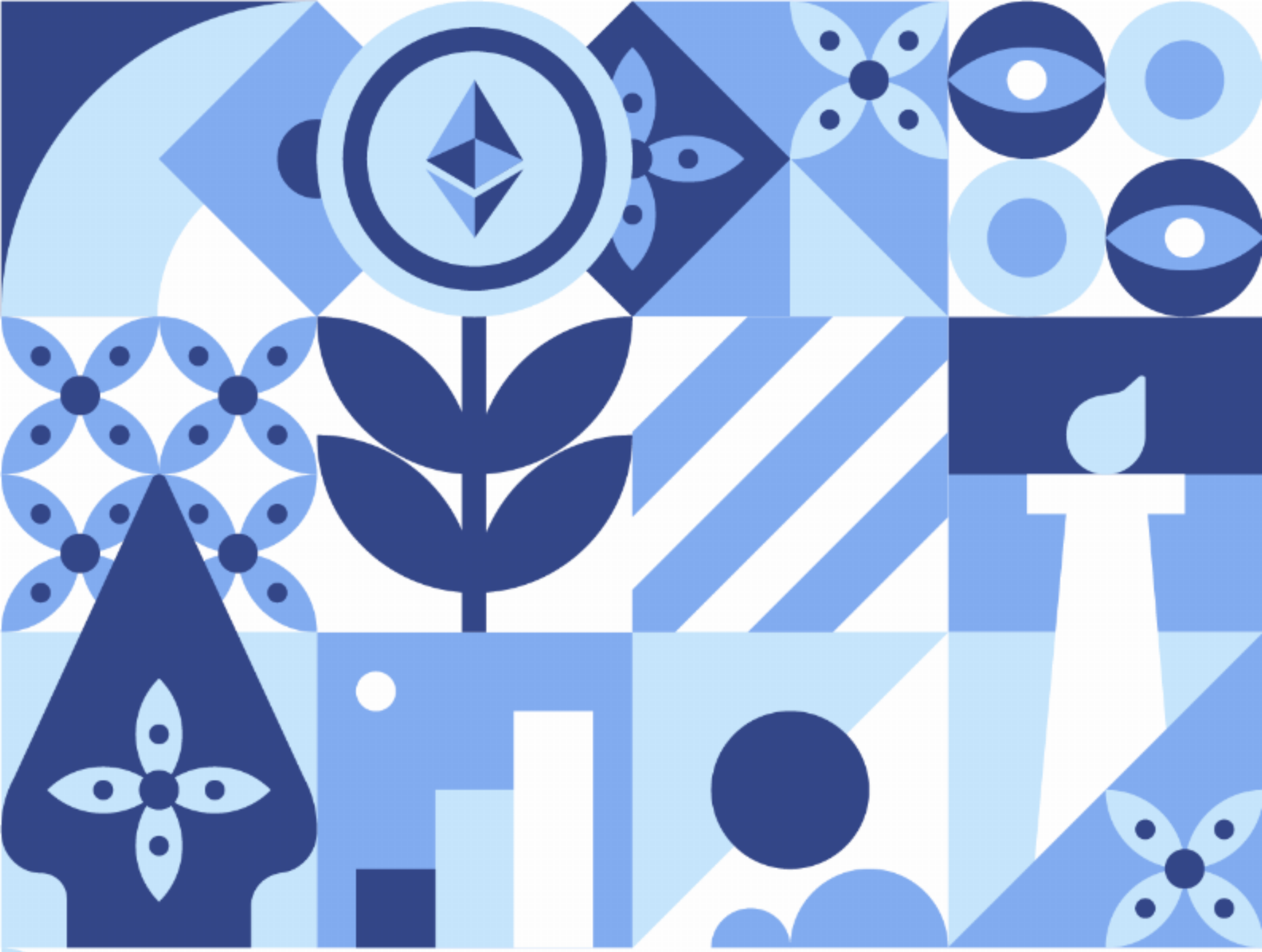

MEDCASH

Smart Contract Audit Report

SYSFIXED

23 Feb 2021

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AUDITED DETAILS

Audited Project

Project name	Token ticker	Blockchain
MEDCASH	MEDCASH	Ethereum

Addresses

Contract address	0x6652Fa201B6BBBC0b5b0aD3f5702b2B9849cc830
Contract deployer address	0xd2f53564F08e7dee0C85678c4e7aF2BCDA23530e

Project Website

https://medxchange.io/

Codebase

https://etherscan.io/address/0x6652Fa201B6BBBC0b5b0aD3f5702b2B9849cc830#code

SUMMARY

MedXchange is the trusted global marketplace for Personal Protective Equipment (PPE), medical devices, supplies and service, enhanced by Blockchain technologies. MedXchange is a distributed system that handles transactions, data transfer, payments, and data storage initially designed for PPE (globally critical and time sensitive) and medical devices, but sufficiently flexible and scalable to later add other categories of regulated health care ecosystems, such as pharmaceuticals, laboratory equipment, and care providers. Because of the sensitive nature and requirements of medical devices, existing blockchain distributed systems are not adequate.

Contract Summary

Documentation Quality

MEDCASH 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 MEDCASH with the discovery of several low issues.

Test Coverage

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

Audit Findings Summary

- SWC-100 SWC-108 | Explicitly define visibility for all state variables on lines 73 and 75.
- SWC-101 | It is recommended to use vetted safe math libraries for arithmetic operations consistently on lines 7, 8, 14, 15, 15, 15, 21 and 25.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 1.
- SWC-111 | It is recommended to use alternatives to the deprecated constructions on lines 6, 12, 19, 24, 145, 149, 186, 67 and 130.

CONCLUSION

We have audited the MEDCASH project released on February-2021 to discover issues and identify potential security vulnerabilities in MEDCASH 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 a satisfactory result with some low-risk issues.

The issues found in the MEDCASH 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, a state variable visibility is not set, and the use of the "constant" state mutability modifier and "throw" keyword is deprecated. It is recommended to use alternatives to the deprecated constructions.

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.	ISSUE FOUND
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.	PASS
Deprecated Solidity Functions	SWC-111	Deprecated built-in functions should never be used.	ISSUE FOUND
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	Monday Feb 22 2021 06:10:02 GMT+0000 (Coordinated Universal Time)
Finished	Tuesday Feb 23 2021 20:58:12 GMT+0000 (Coordinated Universal Time)
Mode	Standard
Main Source File	MEDCASH.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-103	NO PRAGMA IS SET.	low	acknowledged
SWC-108	STATE VARIABLE VISIBILITY IS NOT SET.	low	acknowledged
SWC-108	STATE VARIABLE VISIBILITY IS NOT SET.	low	acknowledged
SWC-111	USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.	low	acknowledged

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SWC-111	USE OF THE "THROW" KEYWORD IS DEPRECATED.	low	acknowledged
SWC-111	USE OF THE "THROW" KEYWORD IS DEPRECATED.	low	acknowledged

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 7

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
6   function mul(uint256 a, uint256 b) internal constant returns (uint256) {
7   uint256 c = a * b;
8   assert(a == 0 || c / a == b);
9   return c;
10   }
11
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 8

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
7   uint256 c = a * b;
8   assert(a == 0 || c / a == b);
9   return c;
10   }
11
12
```

SWC-101 | ARITHMETIC OPERATION "/" DISCOVERED

LINE 14

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
13   assert(b > 0); // Solidity automatically throws when dividing by 0
14   uint256 c = a / b;
15   assert(a == b * c + a % b); // There is no case in which this doesn't hold
16   return c;
17   }
18
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 15

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
14   uint256 c = a / b;
15   assert(a == b * c + a % b); // There is no case in which this doesn't hold
16   return c;
17   }
18
19
```

SWC-101 | ARITHMETIC OPERATION "*" DISCOVERED

LINE 15

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
14   uint256 c = a / b;
15   assert(a == b * c + a % b); // There is no case in which this doesn't hold
16   return c;
17   }
18
19
```

SWC-101 | ARITHMETIC OPERATION "%" DISCOVERED

LINE 15

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
14   uint256 c = a / b;
15   assert(a == b * c + a % b); // There is no case in which this doesn't hold
16   return c;
17   }
18
19
```

SWC-101 | ARITHMETIC OPERATION "-" DISCOVERED

LINE 21

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
20   assert(b <= a);
21   return a - b;
22   }
23
24   function add(uint256 a, uint256 b) internal constant returns (uint256) {
25
```

SWC-101 | ARITHMETIC OPERATION "+" DISCOVERED

LINE 25

low SEVERITY

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

Source File

- MEDCASH.sol

Locations

```
24   function add(uint256 a, uint256 b) internal constant returns (uint256) {
25   uint256 c = a + b;
26   assert(c >= a);
27   return c;
28   }
29
```

SWC-103 | NO PRAGMA IS SET.

LINE 1

low SEVERITY

It is recommended to make a conscious choice on what version of Solidity is used for compilation. Currently no version is set in the Solidity file.

Source File

- MEDCASH.sol

Locations

```
0
1   /**
2   *Submitted for verification at Etherscan.io on 2021-03-04
3   */
4
5
```

SWC-108 | STATE VARIABLE VISIBILITY IS NOT SET.

LINE 73

low SEVERITY

It is best practice to set the visibility of state variables explicitly. The default visibility for "balances" is internal. Other possible visibility settings are public and private.

Source File

- MEDCASH.sol

Locations

```
72   // Balances for each account
73   mapping(address => uint256) balances;
74   // Owner of account approves the transfer of an amount to another account
75   mapping(address => mapping(address=>uint256)) allowed;
76
77
```

SWC-108 | STATE VARIABLE VISIBILITY IS NOT SET.

LINE 75

low SEVERITY

It is best practice to set the visibility of state variables explicitly. The default visibility for "allowed" is internal. Other possible visibility settings are public and private.

Source File

- MEDCASH.sol

Locations

```
74   // Owner of account approves the transfer of an amount to another account
75   mapping(address => mapping(address=>uint256)) allowed;
76
77   // Its a payable function works as a token factory.
78   function () payable{
79
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 6

low SEVERITY

Using "constant" as a state mutability modifier in function "mul" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
5   library SafeMath {
6   function mul(uint256 a, uint256 b) internal constant returns (uint256) {
7   uint256 c = a * b;
8   assert(a == 0 || c / a == b);
9   return c;
10
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 12

low SEVERITY

Using "constant" as a state mutability modifier in function "div" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
11
12   function div(uint256 a, uint256 b) internal constant returns (uint256) {
13   assert(b > 0); // Solidity automatically throws when dividing by 0
14   uint256 c = a / b;
15   assert(a == b * c + a % b); // There is no case in which this doesn't hold
16
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 19

low SEVERITY

Using "constant" as a state mutability modifier in function "sub" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
18
19   function sub(uint256 a, uint256 b) internal constant returns (uint256) {
20   assert(b <= a);
21   return a - b;
22   }
23
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 24

low SEVERITY

Using "constant" as a state mutability modifier in function "add" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
23
24   function add(uint256 a, uint256 b) internal constant returns (uint256) {
25   uint256 c = a + b;
26   assert(c >= a);
27   return c;
28
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 145

low SEVERITY

Using "constant" as a state mutability modifier in function "totalSupply" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
144
145   function totalSupply() constant returns(uint256){
146   return _totalSupply;
147   }
148   // What is the balance of a particular account?
149
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 149

low SEVERITY

Using "constant" as a state mutability modifier in function "balanceOf" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
148   // What is the balance of a particular account?
149   function balanceOf(address _owner) constant returns(uint256){
150   return balances[_owner];
151   }
152
153
```

SWC-111 | USE OF THE "CONSTANT" STATE MUTABILITY MODIFIER IS DEPRECATED.

LINE 186

low SEVERITY

Using "constant" as a state mutability modifier in function "allowance" is disallowed as of Solidity version 0.5.0. Use "view" instead.

Source File

- MEDCASH.sol

Locations

```
185   // Returns the amount which _spender is still allowed to withdraw from _owner
186   function allowance(address _owner, address _spender) constant returns(uint256){
187   return allowed[_owner][_spender];
188   }
189
190
```

SWC-111 | USE OF THE "THROW" KEYWORD IS DEPRECATED.

LINE 67

low SEVERITY

"throw" is disallowed as of Solidity version 0.5.0. Use one of "revert()", "require()" or "assert()" instead

Source File

- MEDCASH.sol

Locations

```
66   if (msg.sender != owner) {
67   throw;
68   }
69   _;
70   }
71
```

SWC-111 | USE OF THE "THROW" KEYWORD IS DEPRECATED.

LINE 130

low SEVERITY

"throw" is disallowed as of Solidity version 0.5.0. Use one of "revert()", "require()" or "assert()" instead

Source File

- MEDCASH.sol

Locations

```
129   else{
130   throw;
131   }
132   }
133
134
```

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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.

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