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• Disclaimer

The audit makes no statements or warranties about utility of the code, safety of the code, suitability of the business model, regulatory regime for the business model, or any other statements about fitness of the contracts to purpose, or their bug free status. The audit documentation is for discussion purposes only.

• Overview of the audit

The project has 2 files. It contains approx 2534 lines of Solidity code. All the functions and state variables are well commented using the natspec documentation, but that does not create any vulnerability.

• Attacks made to the contract

In order to check for the security of the contract, we tested several attacks in order to make sure that the contract is secure and follows best practices.

- ## Over and under flows

An overflow happens when the limit of the type variable uint256, 2 ** 256, is exceeded. What happens is that the value resets to zero instead of incrementing more. On the other hand, an underflow happens when you try to subtract 0 minus a number bigger than 0. For example, if you subtract 0 - 1 the result will be = 2 ** 256 instead of -1. This is quite dangerous.

This contract **does** check for overflows and underflows by using OpenZeppelin's SafeMath to mitigate this attack, but all the functions have strong validations, which prevented this attack.

- ## Short address attack

If the token contract has enough amount of tokens and the buy function doesn't check the length of the address of the sender, the Ethereum's virtual machine will just add zeros to the transaction until the address is complete.

Although this contract **is not vulnerable** to this attack, but there are some point where users can mess themselves due to this (Please see below). It is highly recommended to call functions after checking validity of the address.

- ## Visibility & Delegate call

It is also known as, The Parity Hack, which occurs while misuse of Delegate call.

No such issues found in this smart contract and visibility also properly addressed. There are some places where there is no visibility defined. Smart Contract will assume "Public" visibility if there is no visibility defined. It is good practice to explicitly define the visibility, but again, the contract is not prone to any vulnerability due to this in this case.

- ## Reentrancy / TheDAO hack

Reentrancy occurs in this case: any interaction from a contract (A) with another contract (B) and any transfer of Ethereum hands over control to that contract (B).

This makes it possible for B to call back into A before this interaction is completed.

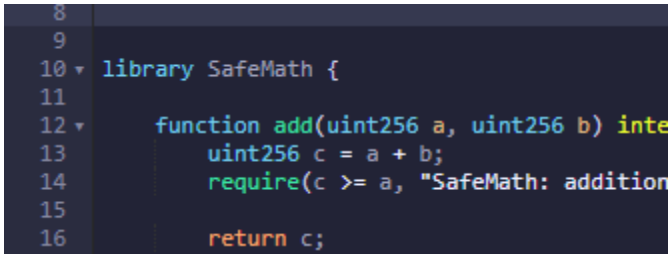
Use of "require" function in this smart contract mitigated this vulnerability.

- **Forcing Ethereum to a contract**

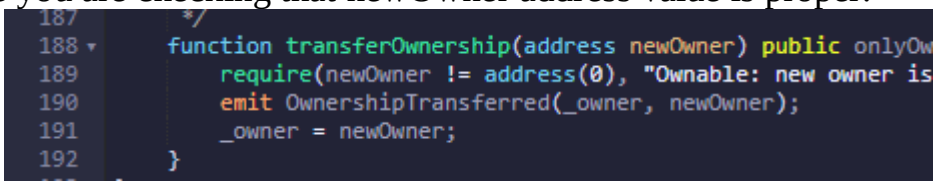
While implementing "selfdestruct" in smart contract, it sends all the ethereum to the target address. Now, if the target address is a contract address, then the fallback function of target contract does not get called. And thus Hacker can bypass the "Required" conditions. Here, the Smart Contract's balance has never been used as guard, which mitigated this vulnerability.

Good things in smart contract

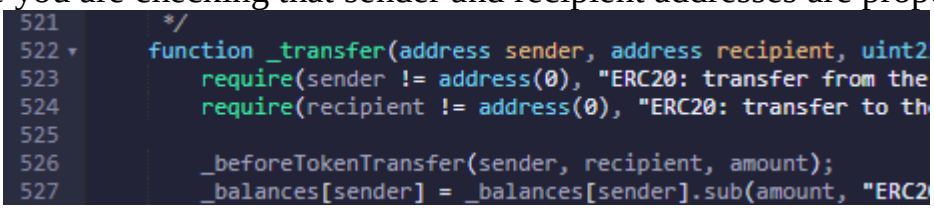
- **Filename: - ZOMFINANCE.sol**
- **SafeMath library (For all files):-**
  - You are using SafeMath library it is a good thing. This protects you from underflow and overflow attacks.



- **Good required condition in functions:-**
  - Here you are checking that newOwner address value is proper.



  - Here you are checking that sender and recipient addresses are proper.



- Here you are checking that a account address value is proper.

```
540         */
541         function _mint(address account, uint256 amount) inter
542             require(account != address(0), "ERC20: mint to th
543
544             _beforeTokenTransfer(address(0), account, amount)
545
546             _totalSupply = _totalSupply.add(amount);
```

- Here you are checking that an account address value is proper.

```
561         */
562         function _burn(address account, uint256 amount) internal vi
563             require(account != address(0), "ERC20: burn from the ze
564
565             _beforeTokenTransfer(account, address(0), amount);
566
```

- Here you are checking that an owner and spender addresses value is proper.

```
583         * - `spender` cannot be the zero address.
584         */
585         function _approve(address owner, address spender, uint256 am
586             require(owner != address(0), "ERC20: approve from the ze
587             require(spender != address(0), "ERC20: approve to the ze
588
589             _allowances[owner][spender] = amount;
590             emit Approval(owner, spender, amount);
```

- Here you are checking that signatory is proper address, nonce value is correct as per coming from outside, expiry time is bigger than current time.

```
805         address signatory = ecrecover(digest, v, r, s);
806         require(signatory != address(0), "ZOM::delegateBySig: invalid signature");
807         require(nonce == nonces[signatory]++, "ZOM::delegateBySig: invalid nonce");
808         require(now <= expiry, "ZOM::delegateBySig: signature expired");
809         return _delegate(signatory, delegatee);
810     }
```

- Here you are checking that an blockNumber is less than current block number.

```
833         function getPriorVotes(address account, uint blockNumber)
834             external
835             view
836             returns (uint256)
837         {
838             require(blockNumber < block.number, "ZOM::getPriorVotes
839
```

- **FileName: - ZOMCHEF.sol**
- **Good required condition in functions:-**
  - Here you are checking that a newOwner address is peoper.

```
77      function transferOwnership(address newOwner) public onlyOwner {
78          require(newOwner != address(0), "Ownable: new owner is the ze
79          emit OwnershipTransferred(_owner, newOwner);
80          _owner = newOwner;
81      }
82  }
```

- Here you are checking that an index value is smaller than length of set value.

```
210      */
211      function _at(Set storage set, uint256 index) private view retu
212          require(set._values.length > index, "EnumerableSet: index
213          return set._values[index];
214      }
```

- Here you are checking that an amount balance is less than or equal contract balance and call function is successfully called.

```
374      */
375      function sendValue(address payable recipient, uint256 amount) internal {
376          require(address(this).balance >= amount, "Address: insufficient balance");
377
378          // solhint-disable-next-line avoid-low-level-calls, avoid-call-value
379          (bool success, ) = recipient.call{ value: amount }("");
380          require(success, "Address: unable to send value, recipient may have reverte
381      }
```

- Here you are checking that a value is balance of contract is bigger than value.

```
435      */
436      function functionCallWithValue(address target, bytes memory data,
437          require(address(this).balance >= value, "Address: insufficient
438          return _functionCallWithValue(target, data, value, errorMessag
439      }
```

- Here you are checking that a target address is proper.

```
440
441      function _functionCallWithValue(address target, bytes memory data, uint256 we
442          require(isContract(target), "Address: call to non-contract");
443
444          // solhint-disable-next-line avoid-low-level-calls
445          (bool success, bytes memory returndata) = target.call{ value: weiValue }(
446          if (success) {
```

- Here you are checking that a sender and recipient addresses are proper.

```
935      */
936      function _transfer(address sender, address recipient, uint
937          require(sender != address(0), "ERC20: transfer from th
938          require(recipient != address(0), "ERC20: transfer to t
939
940          _beforeTokenTransfer(sender, recipient, amount);
```

- Here you are checking that an account address is proper.

```
954      */
955      function _mint(address account, uint256 amount) internal virtu
956          require(account != address(0), "ERC20: mint to the zero ac
957
958          _beforeTokenTransfer(address(0), account, amount);
959
```

- Here you are checking that an account address is proper.

```
975         */
976     function _burn(address account, uint256 amount) internal
977         require(account != address(0), "ERC20: burn from the
978
979         _beforeTokenTransfer(account, address(0), amount);
980
```

- Here you are checking that an owner and spender addresses are proper.

```
998     */
999     function _approve(address owner, address spender, uint256 amount) internal
1000        require(owner != address(0), "ERC20: approve from the zero address");
1001        require(spender != address(0), "ERC20: approve to the zero address");
1002
1003        _allowances[owner][spender] = amount;
```

- Here you are checking that signatory is proper address, nonce value is correct as per coming from outside, expiry time is bigger than current time.

```
1220        address signatory = ecrecover(digest, v, r, s);
1221        require(signatory != address(0), "ZOM::delegateBySig: invalid signature");
1222        require(nonce == nonces[signatory]++, "ZOM::delegateBySig: invalid nonce");
1223        require(now <= expiry, "ZOM::delegateBySig: signature expired");
1224        return _delegate(signatory, delegatee);
```

- Here you are checking that a blockNumber is less than number of block.

```
1248    function getPriorVotes(address account, uint blockNumber)
1249        external
1250        view
1251        returns (uint256)
1252    {
1253        require(blockNumber < block.number, "ZOM::getPriorVotes:
```

- Here you are checking that a msg.sender is devaddr.

```
1597    function dev(address _devaddr) public {
1598        require(msg.sender == devaddr, "dev: wut?");
1599        devaddr = _devaddr;
1600    }
```

- **Critical vulnerabilities found in the contract**

=> No Critical vulnerabilities found

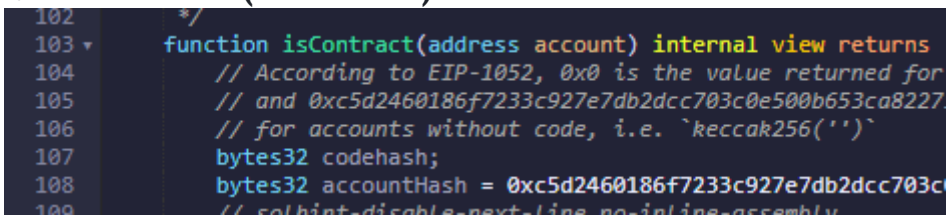
- **Medium vulnerabilities found in the contract**

=> No Medium vulnerabilities found

- **Low severity vulnerabilities found**
  - **FileName:- ZOMFINANCE.sol**
    - **7.1: Short address attack:-**

=> This is not a big issue in solidity, because now a days is increased In the new solidity version. But it is good practice to Check for the short address.
=> After updating the version of solidity it's not mandatory.
=> In some functions you are not checking the value of the address parameter

Function:- isContract ('account')



- It's necessary to check the address value of "account". Because here you are passing whatever variable comes in "account" address from outside.

Function: - transfer (‘recipient’)

```
683
684     function transfer(address recipient, uint256 amount) public
685         // reduce 5% from the amount
686         uint256 amounttoburn = _getamount(amount);
687         // send rest amount to receiver
688         uint256 amounttosend = amount.sub(amounttoburn);
689
```

- It's necessary to check the address value of "recipient". Because here you are passing whatever variable comes in "recipient" address from outside.

Function: - transferFrom(‘sender’, ‘recipient’)

```
711      */
712     function transferFrom(address sender, address recipient,
713         // reduce 5% from the amount
714         uint256 amounttoburn = _getamount(amount);
715         // send rest amount to receiver
716         uint256 amounttosend = amount.sub(amounttoburn);
717
```

- It's necessary to check the addresses value of "sender", and "recipient". Because here you are passing whatever variables come in "sender", and "recipient" addresses from outside.

Function: - getPriorVotes (‘account’)

```
832      */
833     function getPriorVotes(address account, uint blockNumber)
834         external
835         view
836         returns (uint256)
837     {
838         require(blockNumber < block.number, "ZOM::getPriorVotes:
```

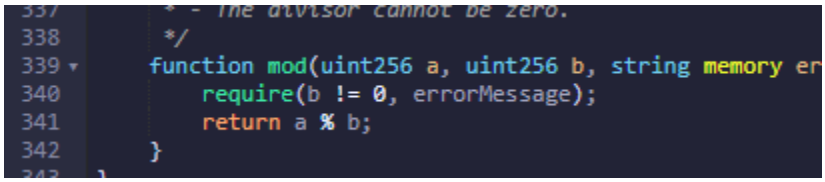
- It's necessary to check the address value of "account". Because here you are passing whatever variable comes in "account" address from outside.

○ 7.2: Some method is not used from safeMath library (For all files):-

=> You have implemented safeMath library in a smart contract.

=> I found that one method (mod) is unused from safeMath library.

=> You can remove that method to reduce your code.



○ 7.3: Compiler version not fixed (For all files):-

=> In this file you have put “pragma solidity ^0.6.0;” which is not a good way to define compiler version.

=> Solidity source files indicate the versions of the compiler they can be compiled with. Pragma solidity ^0.6.0; // bad: compiles 0.6.0 and above pragma solidity 0.5.0; //good: compiles 0.6.0 only

=> If you put(^) symbol then you are able to get compiler version 0.6.0 and above. But if you don’t use(^) symbol then you are able to use only 0.6.0 version. And if there are some changes come in the compiler and you use the old version then some issues may come at deploy time.

=> Use latest version of solidity.

- **FileName:- ZOMCHEF.sol**

○ 7.4: Short address attack:-

=> This is not a big issue in solidity, because now a days is increased In the new solidity version. But it is good practice to Check for the short address.

=> After updating the version of solidity it’s not mandatory.

=> In some functions you are not checking the value of Address parameter

Function: - isContract (‘account’)

```
348     function isContract(address account) internal view returns
349         // This method relies in extcodesize, which returns 0
350         // construction, since the code is only stored at the
351         // constructor execution.
352
353         uint256 size;
354         // solhint-disable-next-line no-inline-assembly
```

- It's necessary to check the address value of "account". Because here you are passing whatever variable comes in "account" address from outside.

Function: - sendValue (‘recipient’)

```
374     */
375     function sendValue(address payable recipient, uint256 amount
376         require(address(this).balance >= amount, "Address: insuf
377
378         // solhint-disable-next-line avoid-low-level-calls, avoi
379         (bool success, ) = recipient.call{ value: amount }("");
380         require(success, "Address: unable to send value, recipie
```

- It's necessary to check the address value of "recipient". Because here you are passing whatever variable comes in "recipient" address from outside.

Function: - safeApprove (‘spender’)

```
718     */
719     function safeApprove(IERC20 token, address spender, uint256 value
720         // safeApprove should only be called when setting an initial
721         // or when resetting it to zero. To increase and decrease it,
722         // 'safeIncreaseAllowance' and 'safeDecreaseAllowance'
723         // solhint-disable-next-line max-line-length
724         require((value == 0) || (token.allowance(address(this), spend
```

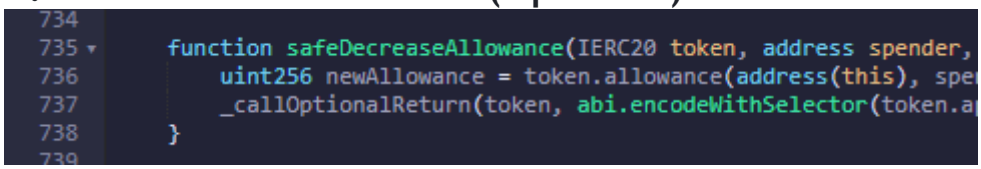
- It's necessary to check the address value of "spender". Because here you are passing whatever variable comes in "spender" address from outside.

Function: - safeIncreaseAllowance(‘spender’)

```
729
730     function safeIncreaseAllowance(IERC20 token, address spender
731         uint256 newAllowance = token.allowance(address(this), sp
732         _callOptionalReturn(token, abi.encodeWithSelector(token
733     }
734
```

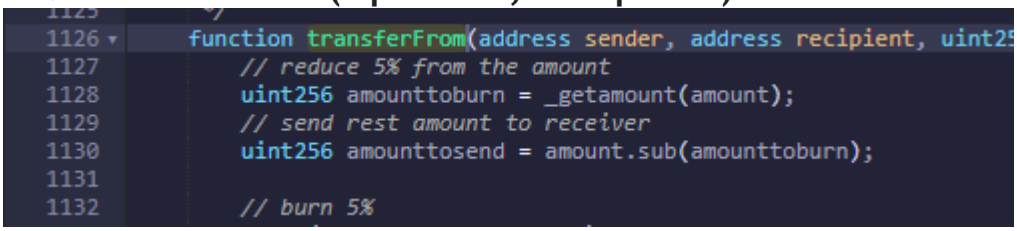
- It's necessary to check the address value of "spender". Because here you are passing whatever variable comes in "spender" address from outside.

- **Function: - safeDecreaseAllowance('spender')**



  - It's necessary to check the address value of "spender". Because here you are passing whatever variable comes in "spender" address from outside.

- **Function: - transferFrom('spender', 'recipient')**



  - It's necessary to check the addresses value of "spender", "recipient". Because here you are passing whatever variable comes in "spender", "recipient" addresses from outside.

7.5: Unchecked return value or response:-

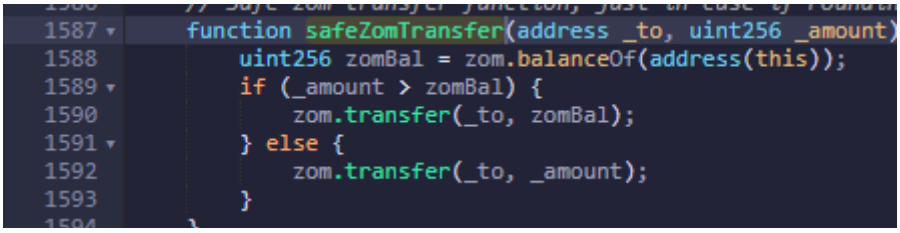
=> I have found that you are transferring fund to address using a transfer method.

=> It is always good to check the return value or response from a function call.

=> Here are some functions where you forgot to check a response.

=> I suggest, if there is a possibility then please check the response.

- **Function: - safedefitokentestTransferRA**



  - Here you are calling transfer method 2 times. It is good to check that the transfer is successfully done or not.

- **Function: - safeTransfer**

```
702     using Address for address;
703
704     function safeTransfer(IERC20 token, address to, uint256 va
705         _callOptionalReturn(token, abi.encodeWithSelector(toke
706     }
707
```

  - Here you are calling transfer method a time. It is good to check that the transfer is successfully done or not.

- **Function: - safeTransferFrom**

```
707
708     function safeTransferFrom(IERC20 token, address from, ad
709         _callOptionalReturn(token, abi.encodeWithSelector(to
710     }
711
```

  - Here you are calling transfer method 1 time. It is good to check that the transfer is successfully done or not.

• Summary of the Audit

Overall the code is well and performs well.

Please try to check the address and value of token externally before sending to the solidity code.

Our final recommendation would be to pay more attention to the visibility of the functions , hardcoded address and mapping since it's quite important to define who's supposed to executed the functions and to follow best practices regarding the use of assert, require etc. (which you are doing ;)).

- **Note:** Please focus on version of solidity (Use latest), check addresses, and check return value of transfer method.
- I have seen that a developer is using block's timestamp and now method so, I like to tell you that write smart contracts with the notion that block values are not precise, and the use of them can lead to unexpected effects.