

Energy Web Token Bridged Smart Contract Audit Report



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AUDITED DETAILS

Audited Project

Project name	Token ticker	Blockchain
Energy Web Token Bridged	EWTB	Ethereum

Addresses

Contract address	0x178c820f862B14f316509ec36b13123DA19A6054	
Contract deployer address	0x4Fa5fE98fe0556C9AF37542149D59B0bDe52B17B	

Project Website

https://energyweb.org/

Codebase

https://etherscan.io/address/0x178c820f862B14f316509ec36b13123DA19A6054#code



SUMMARY

Energy Web Token (EWT) is the operational token behind the Energy Web Chain, a blockchain-based virtual machine designed to support and further application development for the energy sector.

Contract Summary

Documentation Quality

Energy Web Token Bridged provides a very poor documentation with standard of solidity base code.

• The technical description is provided unclear and disorganized.

Code Quality

The Overall quality of the basecode is poor.

• Solidity basecode and rules are unclear and disorganized by Energy Web Token Bridged.

Test Coverage

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

Audit Findings Summary

- SWC-102 | It is recommended to use a recent version of the Solidity compiler on lines 500, 514, 525, 535 and 593.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 7, 24, 79, 130, 164, 189, 315, 382, 444 and 468.
- SWC-104 | It is recommended to use handle at low-level call methods on lines 659 and 558.
- SWC-107 | It is recommended to use a reentrancy lock, reentrancy weaknesses detected on lines 653.
- 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 72, 659 and 574.
- SWC-113 SWC-128 | It is recommended to implement the contract logic to handle failed calls and block gas limit on lines 559.



CONCLUSION

We have audited the Energy Web Token Bridged project released in April 2020 to find issues and identify potential security vulnerabilities in the Energy Web Token Bridged project. This process is used to find technical issues and security loopholes that may be found in smart contracts.

The security audit report gave unsatisfactory results with the discovery of high-risk issues and several other low-risk issues.

Writing a contract that does not follow the Solidity style guide can pose a significant risk. The medium-risk problem we found is an unchecked return value from external calls, and multiple calls are executed in the same transaction. External calls return a boolean value. If the callee halts with an exception, 'false' is returned and execution continues in the caller. We recommend to the caller should check whether an exception happened and react accordingly to avoid unexpected behavior. For example, it is often desirable to wrap external calls in require() so the transaction is reverted if the call fails also this call is executed following another call within the same transaction. It is possible that the call never gets executed if a prior call fails permanently. This might be caused intentionally by a malicious callee. If possible, refactor the code such that each transaction only executes one external call or make sure that all callees can be trusted (i.e. they're part of your own codebase). Whereas Low-risk Issues we found are some outdated compiler version is used, floating pragma is set, an assertion violation was triggered, requirement violation, and read of persistent state following the external call.



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.	PASS	
Outdated Compiler Version	SWC-102	It is recommended to use a recent version of the Solidity compiler.	of the ISSUE FOUND	
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.	ISSUE FOUND	
Unprotected Ether Withdrawal	SWC-105	Due to missing or insufficient access controls, malicious parties can withdraw from the contract.		
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.	ISSUE FOUND	
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.	ISSUE FOUND
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.	
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.	
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.	
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.	
Hash Collisions Variable	SWC-133	Using abi.encodePacked() with multiple variable length arguments can, in certain situations, lead to a hash collision.	
Hardcoded gas amount	SWC-134	The transfer() and send() functions forward a fixed amount of 2300 gas.	
Unencrypted Private Data	SWC-136	It is a common misconception that private type variables cannot be read.	



SMART CONTRACT ANALYSIS

Started	Monday Apr 06 2020 08:04:51 GMT+0000 (Coordinated Universal Time)
Finished	Tuesday Apr 07 2020 12:00:21 GMT+0000 (Coordinated Universal Time)
Mode	Standard
Main Source File	ERC677BridgeToken.sol

Detected Issues

ID	Title	Severity	Status
SWC-104	UNCHECKED RETURN VALUE FROM EXTERNAL CALL.	medium	acknowledged
SWC-104	UNCHECKED RETURN VALUE FROM EXTERNAL CALL.	medium	acknowledged
SWC-113	MULTIPLE CALLS ARE EXECUTED IN THE SAME TRANSACTION.	medium	acknowledged
SWC-102	AN OUTDATED COMPILER VERSION IS USED.	low	acknowledged
SWC-102	AN OUTDATED COMPILER VERSION IS USED.	low	acknowledged
SWC-102	AN OUTDATED COMPILER VERSION IS USED.	low	acknowledged
SWC-102	AN OUTDATED COMPILER VERSION IS USED.	low	acknowledged
SWC-102	AN OUTDATED COMPILER VERSION IS USED.	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

SYSFIXED

SWC-103	A FLOATING PRAGMA IS SET.		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-107	READ OF PERSISTENT STATE FOLLOWING EXTERNAL CALL.	low	acknowledged
SWC-110	AN ASSERTION VIOLATION WAS TRIGGERED.	low	acknowledged
SWC-123	REQUIREMENT VIOLATION.	low	acknowledged
SWC-123	REQUIREMENT VIOLATION.	low	acknowledged



SWC-104 | UNCHECKED RETURN VALUE FROM EXTERNAL CALL.

LINE 659

medium SEVERITY

External calls return a boolean value. If the callee halts with an exception, 'false' is returned and execution continues in the caller. The caller should check whether an exception happened and react accordingly to avoid unexpected behavior. For example it is often desirable to wrap external calls in require() so the transaction is reverted if the call fails.

Source File

- ERC677BridgeToken.sol

```
658 function contractFallback(address _from, address _to, uint256 _value, bytes _data)
private returns (bool) {
659 return _to.call(abi.encodeWithSignature("onTokenTransfer(address,uint256,bytes)",
_from, _value, _data));
660 }
661
662 function finishMinting() public returns (bool) {
663
```





SWC-104 | UNCHECKED RETURN VALUE FROM EXTERNAL CALL.

LINE 558

medium SEVERITY

External calls return a boolean value. If the callee halts with an exception, 'false' is returned and execution continues in the caller. The caller should check whether an exception happened and react accordingly to avoid unexpected behavior. For example it is often desirable to wrap external calls in require() so the transaction is reverted if the call fails.

Source File

- ERC677BridgeToken.sol

```
557 uint256 value = address(this).balance;
558 if (!_to.send(value)) {
559 (new Sacrifice).value(value)(_to);
560 }
561 }
562
```



SWC-113 | MULTIPLE CALLS ARE EXECUTED IN THE SAME TRANSACTION.

LINE 559

medium SEVERITY

This call is executed following another call within the same transaction. It is possible that the call never gets executed if a prior call fails permanently. This might be caused intentionally by a malicious callee. If possible, refactor the code such that each transaction only executes one external call or make sure that all callees can be trusted (i.e. they're part of your own codebase).

Source File

- ERC677BridgeToken.sol

```
558 if (!_to.send(value)) {
559 (new Sacrifice).value(value)(_to);
560 }
561 }
562
563
```





SWC-102 | AN OUTDATED COMPILER VERSION IS USED.

LINE 500

Iow SEVERITY

The compiler version specified in the pragma directive may have known bugs. It is recommended to use the latest minor release of solc 0.5 or 0.6. For more information on Solidity compiler bug reports and fixes refer to https://github.com/ethereum/solidity/releases.

Source File

- ERC677BridgeToken.sol

Locations

499
500 pragma solidity 0.4.24;
501
502
503 contract ERC677 is ERC20 {
504



SWC-102 | AN OUTDATED COMPILER VERSION IS USED.

LINE 514

Iow SEVERITY

The compiler version specified in the pragma directive may have known bugs. It is recommended to use the latest minor release of solc 0.5 or 0.6. For more information on Solidity compiler bug reports and fixes refer to https://github.com/ethereum/solidity/releases.

Source File

- ERC677BridgeToken.sol

Locations

513
514 pragma solidity 0.4.24;
515
516
517 contract IBurnableMintableERC677Token is ERC677 {
518



SWC-102 | AN OUTDATED COMPILER VERSION IS USED.

LINE 525

Iow SEVERITY

The compiler version specified in the pragma directive may have known bugs. It is recommended to use the latest minor release of solc 0.5 or 0.6. For more information on Solidity compiler bug reports and fixes refer to https://github.com/ethereum/solidity/releases.

Source File

- ERC677BridgeToken.sol

```
524
525 pragma solidity 0.4.24;
526
527 contract Sacrifice {
528 constructor(address _recipient) public payable {
529
```



C

SWC-102 | AN OUTDATED COMPILER VERSION IS USED.

LINE 535

Iow SEVERITY

The compiler version specified in the pragma directive may have known bugs. It is recommended to use the latest minor release of solc 0.5 or 0.6. For more information on Solidity compiler bug reports and fixes refer to https://github.com/ethereum/solidity/releases.

Source File

- ERC677BridgeToken.sol

Locations



C

SWC-102 | AN OUTDATED COMPILER VERSION IS USED.

LINE 593

Iow SEVERITY

The compiler version specified in the pragma directive may have known bugs. It is recommended to use the latest minor release of solc 0.5 or 0.6. For more information on Solidity compiler bug reports and fixes refer to https://github.com/ethereum/solidity/releases.

Source File

- ERC677BridgeToken.sol

Locations



LINE 7

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations

6 7 pragma solidity ^0.4.24; 8 9 10 /** 11



LINE 24

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations

23
24 pragma solidity ^0.4.24;
25
26
27 /**
28



LINE 79

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 130

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 164

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 189

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 315

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations

314
315 pragma solidity ^0.4.24;
316
317
318 /**
319



LINE 382

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 444

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations



LINE 468

Iow SEVERITY

The current pragma Solidity directive is ""^0.4.24"". 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

- ERC677BridgeToken.sol

Locations

467
468 pragma solidity ^0.4.24;
469
470
471 /**
472



SWC-107 | READ OF PERSISTENT STATE FOLLOWING EXTERNAL CALL.

LINE 653

Iow SEVERITY

The contract account state is accessed after an external call. To prevent reentrancy issues, consider accessing the state only before the call, especially if the callee is untrusted. Alternatively, a reentrancy lock can be used to prevent untrusted callees from re-entering the contract in an intermediate state.

Source File

- ERC677BridgeToken.sol

```
652 if (AddressUtils.isContract(_to) && !contractFallback(_from, _to, _value, new
bytes(0))) {
653 require(_to != bridgeContract);
654 emit ContractFallbackCallFailed(_from, _to, _value);
655 }
656 }
657
```





SWC-110 | AN ASSERTION VIOLATION WAS TRIGGERED.

LINE 72

Iow SEVERITY

It is possible to cause an assertion violation. Note that Solidity assert() statements should only be used to check invariants. Review the transaction trace generated for this issue and either make sure your program logic is correct, or use require() instead of assert() if your goal is to constrain user inputs or enforce preconditions. Remember to validate inputs from both callers (for instance, via passed arguments) and callees (for instance, via return values).

Source File

- ERC677BridgeToken.sol

```
71  c = _a + _b;
72  assert(c >= _a);
73  return c;
74  }
75  }
76
```





SWC-123 | REQUIREMENT VIOLATION.

LINE 659

Iow SEVERITY

A requirement was violated in a nested call and the call was reverted as a result. Make sure valid inputs are provided to the nested call (for instance, via passed arguments).

Source File

- ERC677BridgeToken.sol

```
658 function contractFallback(address _from, address _to, uint256 _value, bytes _data)
private returns (bool) {
659 return _to.call(abi.encodeWithSignature("onTokenTransfer(address,uint256,bytes)",
_from, _value, _data));
660 }
661
662 function finishMinting() public returns (bool) {
663
```





SWC-123 | REQUIREMENT VIOLATION.

LINE 574

Iow SEVERITY

A requirement was violated in a nested call and the call was reverted as a result. Make sure valid inputs are provided to the nested call (for instance, via passed arguments).

Source File

- ERC677BridgeToken.sol

```
573 assembly {
574 let result := call(gas, _token, 0x0, add(callData, 0x20), mload(callData), 0, 32)
575 returnData := mload(0)
576 returnDataResult := mload(0)
577
578
```



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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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