Assure DeFi®

THE VERIFICATION GOLD STANDARD

Security Assessment

AIToken

Date: 18/04/2025

Audit Status: PASS

Audit Edition: Advanced

ASSURE DEFI®

THE VERIFICATION GOLD STANDARD

Risk Analysis

Vulnerability summary

Classification	Description
🔴 High	High-level vulnerabilities can result in the loss of assets or manipulation of data.
🟠 Medium	Medium-level vulnerabilities can be challenging to exploit, but they still have a considerable impact on smart contract execution, such as allowing public access to critical functions.
🟡 Low	Low-level vulnerabilities are primarily associated with outdated or unused code snippets that generally do not significantly impact execution, sometimes they can be ignored.
🟢 Informational	Informational vulnerabilities, code style violations, and informational statements do not affect smart contract execution and can typically be disregarded.

Executive Summary

According to the Assure assessment, the Customer's smart contract is **Well secured.**

Insecure	Poorly Secured	Secured	**Well Secured**

Scope

Target Code And Revision

For this audit, we performed research, investigation, and review of the AIToken contracts followed by issue reporting, along with mitigation and remediation instructions outlined in this report.

Target Code And Revision

Project	Assure
Language	Solidity
Codebase	ERCAI.sol [SHA256]: cc02dcc265444cf58500d3036c0530f7bbdaea 4a709aa0f81d75505639a3644a ERC ERCAI_V2.sol [SHA256]: ee17d43b4b84db6826f0c56236ab5af1639418 4937ac62be523bcc327a63c2eb ERCAI_V3.sol [SHA256]: e430b971e1983ef58373837ffeb1fe673f5aaa61 f4d477037512e09743812966 ERCAIV3 (1).sol [SHA256] - V.Uncapped outbound correction: f459242f7f6fd980975dd0dc36b643e05524d0a a4377584d0439eb16b129e4cf
Audit Methodology	Static, Manual [excluding libraries, audit scope: from line 938]

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.

Category	Item
Code review & Functional Review	● Compiler warnings. ● Race conditions and Reentrancy. Cross-function race conditions. ● Possible delays in data delivery. ● Oracle calls. ● Front running. ● Timestamp dependence. ● Integer Overflow and Underflow. ● DoS with Revert. ● DoS with block gas limit. ● Methods execution permissions. ● Economy model. ● Private user data leaks. ● Malicious Event log. ● Scoping and Declarations. ● Uninitialized storage pointers. ● Arithmetic accuracy. ● Design Logic. ● Cross-function race conditions. ● Safe Zeppelin module. ● Fallback function security. ● Overpowered functions / Owner privileges

AUDIT OVERVIEW

◆◆◆ HIGH

1. Full Balance added to Liquidity [Fixed ✅]

Function: launch

Issue: Uses address(this).balance when calling addLiquidityETH, which includes all ETH the contract holds (e.g., task deposits). The owner can appropriate funds reserved for rewards or other purposes.

Recommendation: Specify the exact ETH amount to add as liquidity rather than full balance; segregate user-funds into a separate vault or track reserved balances to prevent misuse.

Fix: Swapped to msg.value when calling addLiquidityETH.

◆◆◆ MEDIUM

1. Linear Scan in Task Completion [Fixed ✅]

Function: completeTask()

Issue: Validates assignment by an O(n) scan of agentAssignedTasks[agentId]. With many tasks, this linear check can hit the block gas limit

Recommendation: Use a mapping taskId => assigned for O(1) lookup, or impose a cap on tasks per agent.

Fix: V2 introduces agentTaskAssignments[taskId][agentId] and checks it, but still retains the old for-loop afterward. That loop should be removed. V3: The old for-loop has been removed; only the O(1) agentTaskAssignments[taskId][agentId] check remains.

2. Unbounded Message Pagination [Fixed ✅]

Function: getAgentMessages

Issue: Unbounded array slicing: reading count messages loops and copies each one; large count may exceed gas limits.

Recommendation: Enforce a safe maximum count per call (e.g., ≤ 100), or paginate with fixed page sizes.

Fix: V2 enforces count = min(count, 100) before slicing.

3. Loop DoS in ERC20/ERC721 Transfer [Fixed ✅]

Function: _transferERC20WithERC721

Issue: Unbounded loops over queued NFTs and fractional-token adjustments can be forced to iterate excessively, leading to gas-limit DoS on transfers.

Recommendation: Before entering loops, require(nftsToTransfer <= MAX_BATCH) (and similarly for other loops) or batch the operation.
Fix: V2 adds MAX_BATCH_SIZE for the whole-NFT transfer loop, but the exemption-case loops (tokensToRetrieveOrMint, tokensToWithdrawAndStore) remain unchecked. V3: All three loops (nftsToTransfer, tokensToRetrieveOrMint, tokensToWithdrawAndStore) now guard with if > MAX_BATCH_SIZE revert.

LOW

1. Uncapped Task Array Growth [Fixed ✅]

Function: assignTask, completeTask

Issue: Unlimited growth of agentAssignedTasks without any cap allows endless array pushes, exacerbating DoS vectors.

Recommendation: Impose a reasonable limit on tasks per agent, or require staking to discourage spam.

Fix: V2 enforces agentAssignedTasks[agentId].length < MAX_TASKS_PER_AGENT in assignTask.

2. Missing Reentrancy Guard on Execute [Fixed ✅]

Function: execute()

Issue: Forwards to the external TBA's execute() without its own reentrancy guard, relying solely on the TBA for protection.

Recommendation: Mark execute as nonReentrant (in addition to using the TBA's guard) to harden reentrancy resistance.

Fix: V2 marks both execute() and executeAsAgent() as nonReentrant.

3. Unverified Message Recipient [Fixed ✅]

Function: sendAgentMessage

Issue: Doesn't check that toTokenId actually exists/minted, letting messages be sent to non-existent agents.

Recommendation: Add require(_isValidTokenId(toTokenId + ID_ENCODING_PREFIX), "Recipient not minted").

Fix: V2 adds require(toTokenId <= minted, "Recipient token does not exist")

4. Uncapped Outbound Messages [Fixed ✅]

Function: sendAgentMessage

Issue: No limit on how many messages an agent can send, enabling spam and DoS of storage/gas.

Recommendation: Add require(agentMessages[fromTokenId].length < MAX_MESSAGES) to throttle per-agent messages.

Fix: Added a messagesSentCount mapping and at the top of sendAgentMessage now enforces

```
require(
  messagesSentCount[fromTokenId] < MAX_SENT_MESSAGES_PER_AGENT,
  "Sender has sent too many messages"
);
messagesSentCount[fromTokenId]++;
```
which prevents any single agent from sending more than the allowed number of messages.

INFORMATIONAL

1. Silent Account Creation Failures [Fixed ✅]

Function: createAccount() during the minting

Issue: Silent try {} catch {} on registry createAccount swallows all errors sofailures go unnoticed, possibly leaving NFTs unaccounted.

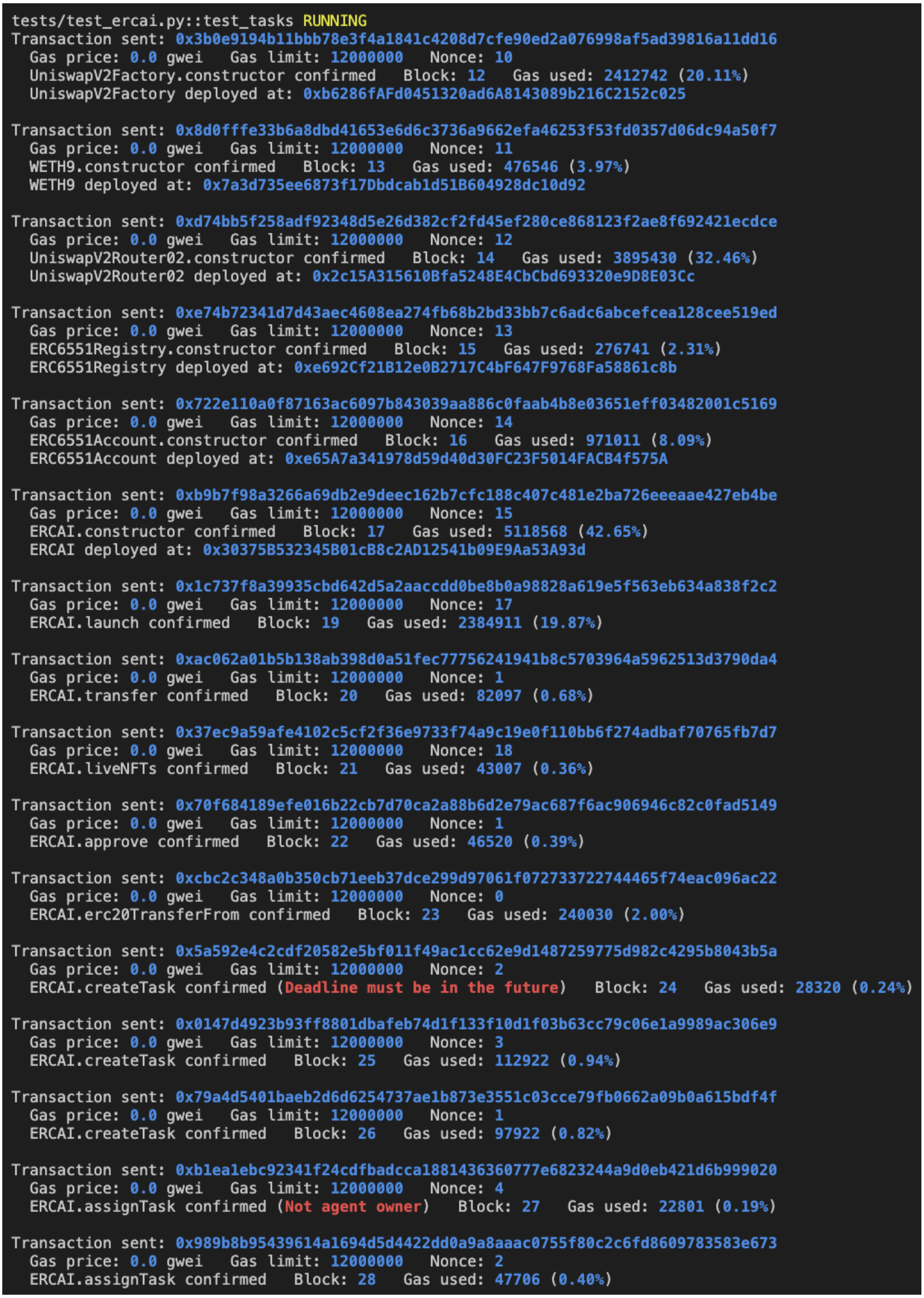
Recommendation: Emit an event or revert on creation failure to ensure visibility and proper troubleshooting

Fix: V2 emits AccountCreationFailed(tokenId, implementation, salt) in the catch.

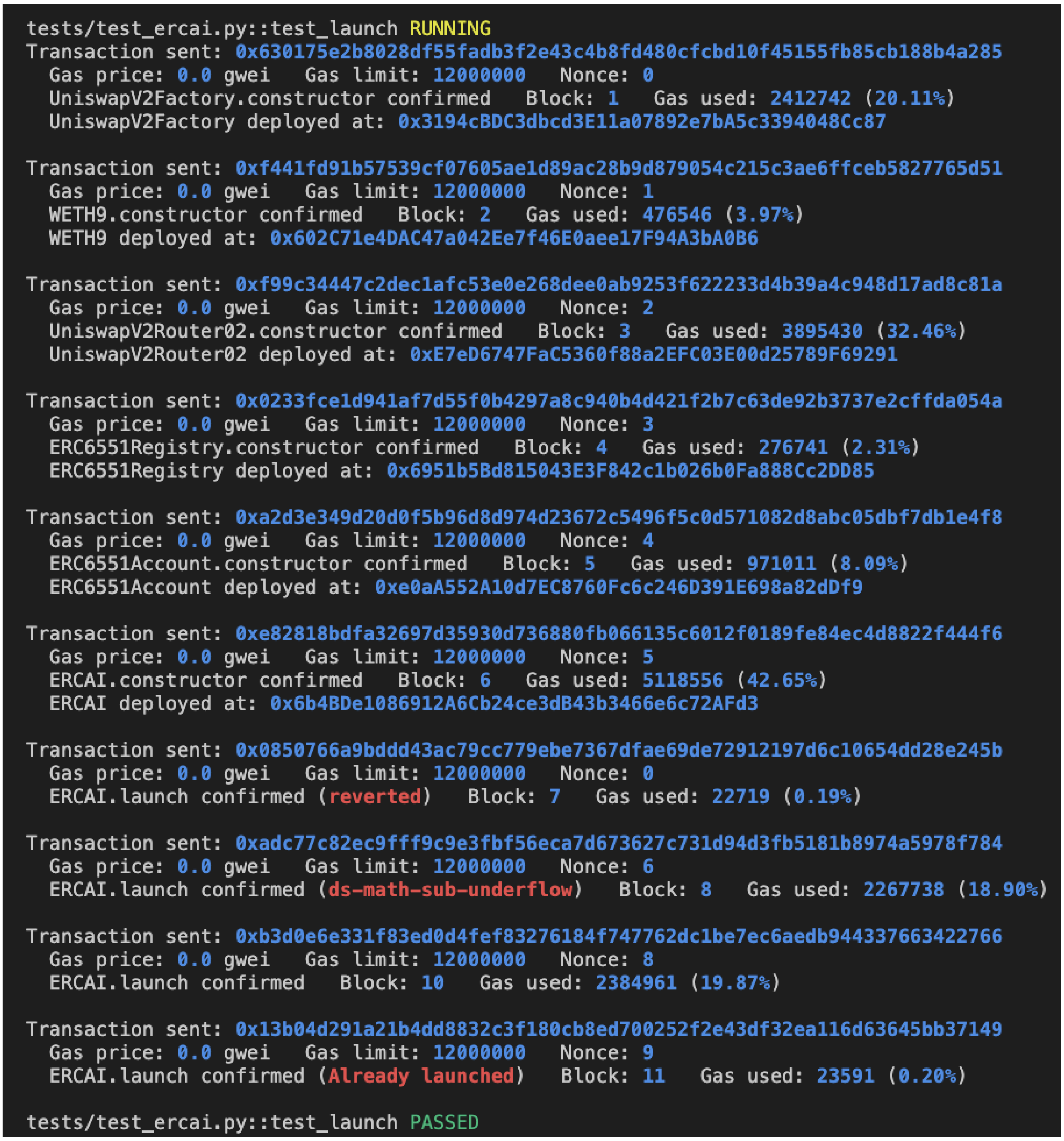
Testing coverage

During the testing phase, custom use cases were written to cover all the logic of contracts. *Check "Annexes" to see the testing code.*

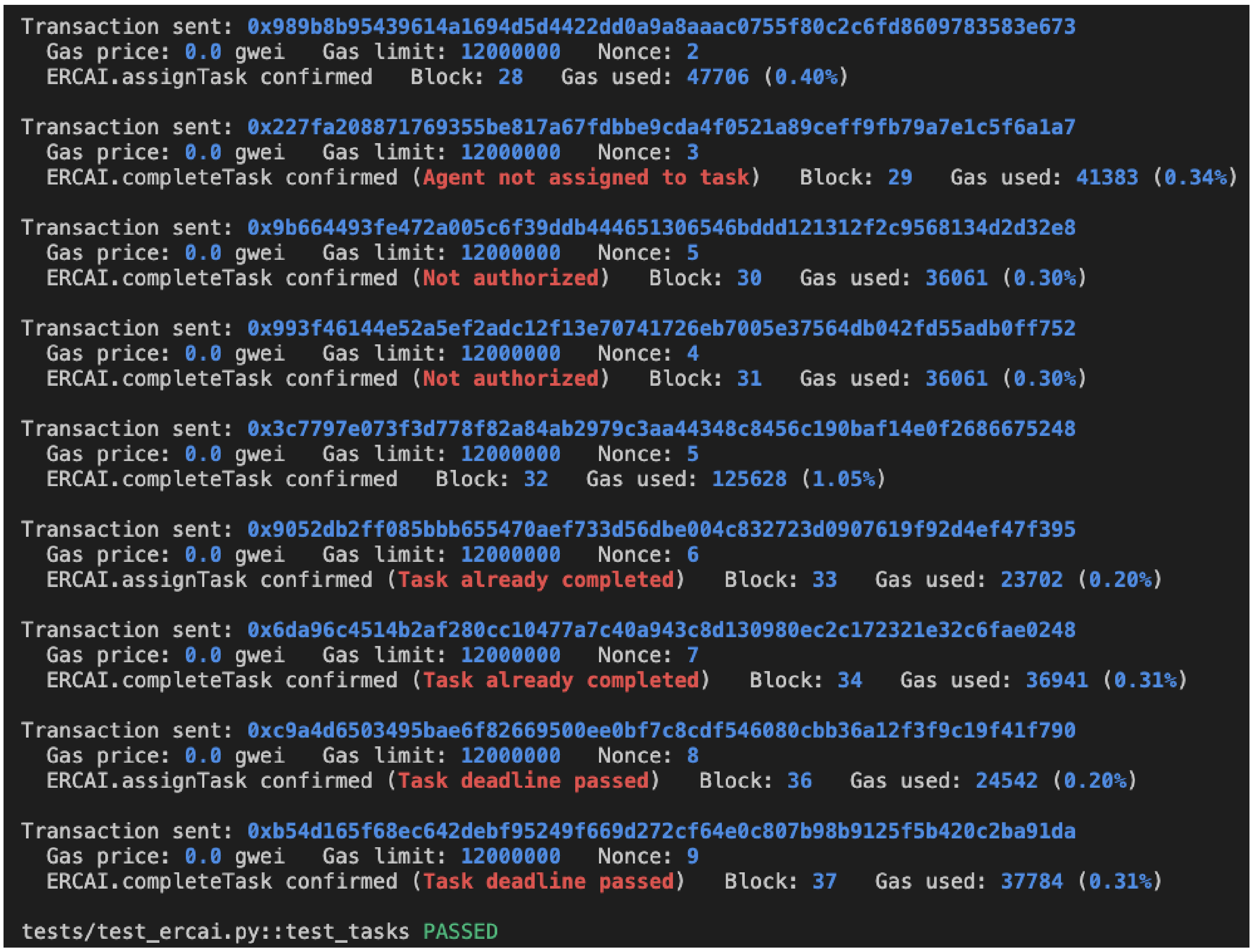
AIToken contract tests:



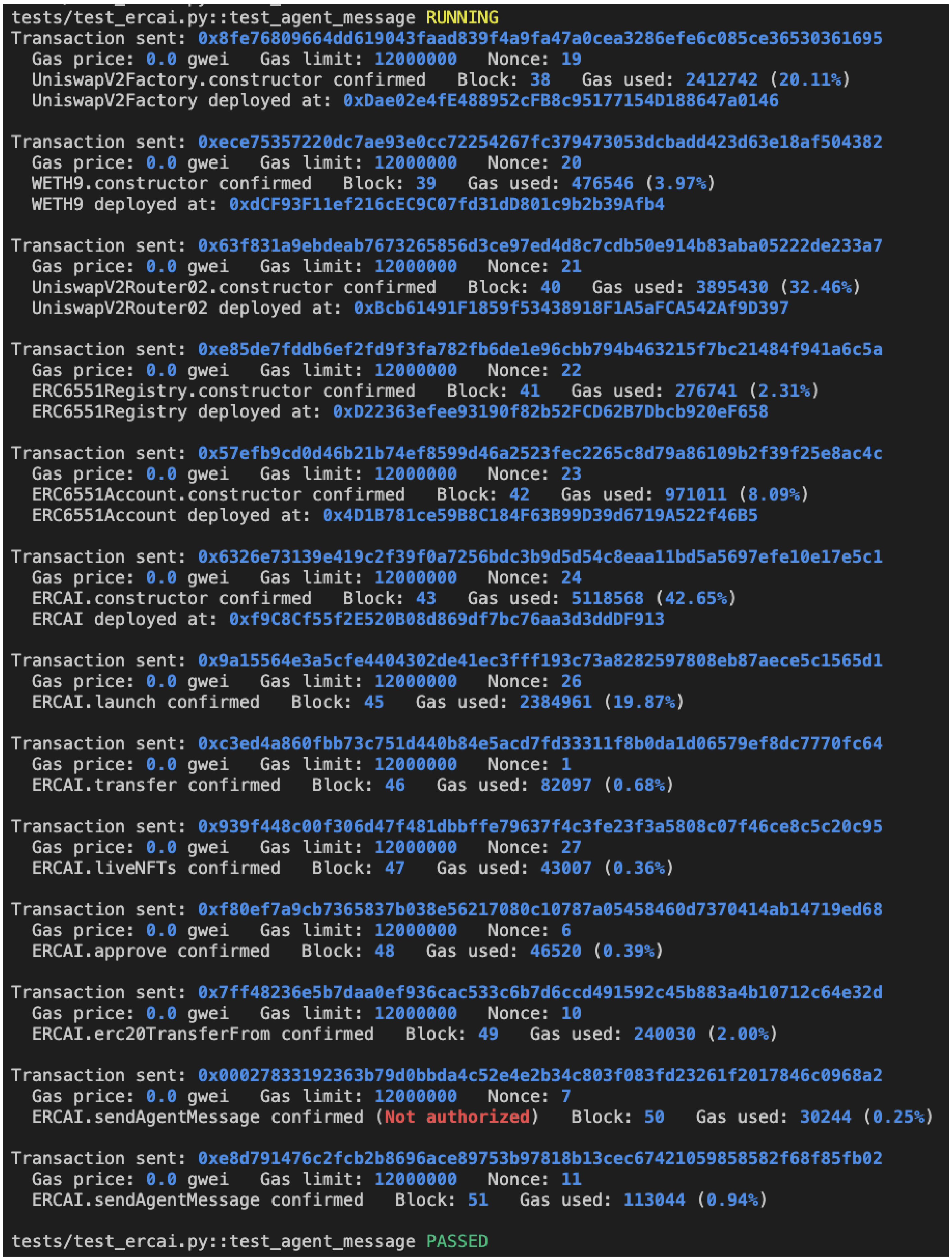
```
tests/test_ercai.py::test_tasks RUNNING
Transaction sent: 0x3b0e9194b11bbb78e3f4a1841c4208d7cfe90ed2a076998af5ad39816a11dd16
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 10
  UniswapV2Factory.constructor confirmed   Block: 12   Gas used: 2412742 (20.11%)
  UniswapV2Factory deployed at: 0xb6286fAFd0451320ad6A8143089b216C2152c025

Transaction sent: 0x8d0fffe33b6a8dbd41653e6d6c3736a9662efa46253f53fd0357d06dc94a50f7
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 11
  WETH9.constructor confirmed   Block: 13   Gas used: 476546 (3.97%)
  WETH9 deployed at: 0x7a3d735ee6873f17Dbdcab1d51B604928dc10d92

Transaction sent: 0xd74bb5f258adf92348d5e26d382cf2fd45ef280ce868123f2ae8f692421ecdce
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 12
  UniswapV2Router02.constructor confirmed   Block: 14   Gas used: 3895430 (32.46%)
  UniswapV2Router02 deployed at: 0x2c15A315610Bfa5248E4CbCbd693320e9D8E03Cc

Transaction sent: 0xe74b72341d7d43aec4608ea274fb68b2bd33bb7c6adc6abcefcea128cee519ed
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 13
  ERC6551Registry.constructor confirmed   Block: 15   Gas used: 276741 (2.31%)
  ERC6551Registry deployed at: 0xe692Cf21B12e0B2717C4bF647F9768Fa58861c8b

Transaction sent: 0x722e110a0f87163ac6097b843039aa886c0faab4b8e03651eff03482001c5169
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 14
  ERC6551Account.constructor confirmed   Block: 16   Gas used: 971011 (8.09%)
  ERC6551Account deployed at: 0xe65A7a341978d59d40d30FC23F5014FACB4f575A

Transaction sent: 0xb9b7f98a3266a69db2e9deec162b7cfc188c407c481e2ba726eeeaae427eb4be
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 15
  ERCAI.constructor confirmed   Block: 17   Gas used: 5118568 (42.65%)
  ERCAI deployed at: 0x30375B532345B01cB8c2AD12541b09E9Aa53A93d

Transaction sent: 0x1c737f8a39935cbd642d5a2aaccdd0be8b0a98828a619e5f563eb634a838f2c2
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 17
  ERCAI.launch confirmed   Block: 19   Gas used: 2384911 (19.87%)

Transaction sent: 0xac062a01b5b138ab398d0a51fec77756241941b8c5703964a5962513d3790da4
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 1
  ERCAI.transfer confirmed   Block: 20   Gas used: 82097 (0.68%)

Transaction sent: 0x37ec9a59afe4102c5cf2f36e9733f74a9c19e0f110bb6f274adbaf70765fb7d7
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 18
  ERCAI.liveNFTs confirmed   Block: 21   Gas used: 43007 (0.36%)

Transaction sent: 0x70f684189efe016b22cb7d70ca2a88b6d2e79ac687f6ac906946c82c0fad5149
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 1
  ERCAI.approve confirmed   Block: 22   Gas used: 46520 (0.39%)

Transaction sent: 0xcbc2c348a0b350cb71eeb37dce299d97061f072733722744465f74eac096ac22
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 0
  ERCAI.erc20TransferFrom confirmed   Block: 23   Gas used: 240030 (2.00%)

Transaction sent: 0x5a592e4c2cdf20582e5bf011f49ac1cc62e9d1487259775d982c4295b8043b5a
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 2
  ERCAI.createTask confirmed (Deadline must be in the future)   Block: 24   Gas used: 28320 (0.24%)

Transaction sent: 0x0147d4923b93ff8801dbafeb74d1f133f10d1f03b63cc79c06e1a9989ac306e9
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 3
  ERCAI.createTask confirmed   Block: 25   Gas used: 112922 (0.94%)

Transaction sent: 0x79a4d5401baeb2d6d6254737ae1b873e3551c03cce79fb0662a09b0a615bdf4f
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 1
  ERCAI.createTask confirmed   Block: 26   Gas used: 97922 (0.82%)

Transaction sent: 0xb1ea1ebc92341f24cdfbadcca1881436360777e6823244a9d0eb421d6b999020
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 4
  ERCAI.assignTask confirmed (Not agent owner)   Block: 27   Gas used: 22801 (0.19%)

Transaction sent: 0x989b8b95439614a1694d5d4422dd0a9a8aaac0755f80c2c6fd8609783583e673
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 2
  ERCAI.assignTask confirmed   Block: 28   Gas used: 47706 (0.40%)
```



```
tests/test_ercai.py::test_launch RUNNING
Transaction sent: 0x630175e2b8028df55fadb3f2e43c4b8fd480cfcbd10f45155fb85cb188b4a285
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 0
  UniswapV2Factory.constructor confirmed   Block: 1   Gas used: 2412742 (20.11%)
  UniswapV2Factory deployed at: 0x3194cBDC3dbcd3E11a07892e7bA5c3394048Cc87

Transaction sent: 0xf441fd91b57539cf07605ae1d89ac28b9d879054c215c3ae6ffceb5827765d51
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 1
  WETH9.constructor confirmed   Block: 2   Gas used: 476546 (3.97%)
  WETH9 deployed at: 0x602C71e4DAC47a042Ee7f46E0aee17F94A3bA0B6

Transaction sent: 0xf99c34447c2dec1afc53e0e268dee0ab9253f622233d4b39a4c948d17ad8c81a
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 2
  UniswapV2Router02.constructor confirmed   Block: 3   Gas used: 3895430 (32.46%)
  UniswapV2Router02 deployed at: 0xE7eD6747FaC5360f88a2EFC03E00d25789F69291

Transaction sent: 0x0233fce1d941af7d55f0b4297a8c940b4d421f2b7c63de92b3737e2cffda054a
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 3
  ERC6551Registry.constructor confirmed   Block: 4   Gas used: 276741 (2.31%)
  ERC6551Registry deployed at: 0x6951b5Bd815043E3F842c1b026b0Fa888Cc2DD85

Transaction sent: 0xa2d3e349d20d0f5b96d8d974d23672c5496f5c0d571082d8abc05dbf7db1e4f8
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 4
  ERC6551Account.constructor confirmed   Block: 5   Gas used: 971011 (8.09%)
  ERC6551Account deployed at: 0xe0aA552A10d7EC8760Fc6c246D391E698a82dDf9

Transaction sent: 0xe82818bdfa32697d35930d736880fb066135c6012f0189fe84ec4d8822f444f6
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 5
  ERCAI.constructor confirmed   Block: 6   Gas used: 5118556 (42.65%)
  ERCAI deployed at: 0x6b4BDe1086912A6Cb24ce3dB43b3466e6c72AFd3

Transaction sent: 0x0850766a9bddd43ac79cc779ebe7367dfae69de72912197d6c10654dd28e245b
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 0
  ERCAI.launch confirmed (reverted)   Block: 7   Gas used: 22719 (0.19%)

Transaction sent: 0xadc77c82ec9fff9c9e3fbf56eca7d673627c731d94d3fb5181b8974a5978f784
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 6
  ERCAI.launch confirmed (ds-math-sub-underflow)   Block: 8   Gas used: 2267738 (18.90%)

Transaction sent: 0xb3d0e6e331f83ed0d4fef83276184f747762dc1be7ec6aedb944337663422766
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 8
  ERCAI.launch confirmed   Block: 10   Gas used: 2384961 (19.87%)

Transaction sent: 0x13b04d291a21b4dd8832c3f180cb8ed700252f2e43df32ea116d63645bb37149
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 9
  ERCAI.launch confirmed (Already launched)   Block: 11   Gas used: 23591 (0.20%)

tests/test_ercai.py::test_launch PASSED
```



```
Transaction sent: 0x989b8b95439614a1694d5d4422dd0a9a8aaac0755f80c2c6fd8609783583e673
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 2
  ERCAI.assignTask confirmed   Block: 28   Gas used: 47706 (0.40%)

Transaction sent: 0x227fa208871769355be817a67fdbbe9cda4f0521a89ceff9fb79a7e1c5f6a1a7
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 3
  ERCAI.completeTask confirmed (Agent not assigned to task)   Block: 29   Gas used: 41383 (0.34%)

Transaction sent: 0x9b664493fe472a005c6f39ddb444651306546bddd121312f2c9568134d2d32e8
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 5
  ERCAI.completeTask confirmed (Not authorized)   Block: 30   Gas used: 36061 (0.30%)

Transaction sent: 0x993f46144e52a5ef2adc12f13e70741726eb7005e37564db042fd55adb0ff752
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 4
  ERCAI.completeTask confirmed (Not authorized)   Block: 31   Gas used: 36061 (0.30%)

Transaction sent: 0x3c7797e073f3d778f82a84ab2979c3aa44348c8456c190baf14e0f2686675248
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 5
  ERCAI.completeTask confirmed   Block: 32   Gas used: 125628 (1.05%)

Transaction sent: 0x9052db2ff085bbb655470aef733d56dbe004c832723d0907619f92d4ef47f395
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 6
  ERCAI.assignTask confirmed (Task already completed)   Block: 33   Gas used: 23702 (0.20%)

Transaction sent: 0x6da96c4514b2af280cc10477a7c40a943c8d130980ec2c172321e32c6fae0248
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 7
  ERCAI.completeTask confirmed (Task already completed)   Block: 34   Gas used: 36941 (0.31%)

Transaction sent: 0xc9a4d6503495bae6f82669500ee0bf7c8cdf546080cbb36a12f3f9c19f41f790
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 8
  ERCAI.assignTask confirmed (Task deadline passed)   Block: 36   Gas used: 24542 (0.20%)

Transaction sent: 0xb54d165f68ec642debf95249f669d272cf64e0c807b98b9125f5b420c2ba91da
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 9
  ERCAI.completeTask confirmed (Task deadline passed)   Block: 37   Gas used: 37784 (0.31%)

tests/test_ercai.py::test_tasks PASSED
```



```
tests/test_ercai.py::test_agent_message RUNNING
Transaction sent: 0x8fe76809664dd619043faad839f4a9fa47a0cea3286efe6c085ce36530361695
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 19
  UniswapV2Factory.constructor confirmed   Block: 38   Gas used: 2412742 (20.11%)
  UniswapV2Factory deployed at: 0xDae02e4fE488952cFB8c95177154D188647a0146

Transaction sent: 0xece75357220dc7ae93e0cc72254267fc379473053dcbadd423d63e18af504382
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 20
  WETH9.constructor confirmed   Block: 39   Gas used: 476546 (3.97%)
  WETH9 deployed at: 0xdCF93F11ef216cEC9C07fd31dD801c9b2b39Afb4

Transaction sent: 0x63f831a9ebdeab7673265856d3ce97ed4d8c7cdb50e914b83aba05222de233a7
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 21
  UniswapV2Router02.constructor confirmed   Block: 40   Gas used: 3895430 (32.46%)
  UniswapV2Router02 deployed at: 0xBcb61491F1859f53438918F1A5aFCA542Af9D397

Transaction sent: 0xe85de7fddb6ef2fd9f3fa782fb6de1e96cbb794b463215f7bc21484f941a6c5a
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 22
  ERC6551Registry.constructor confirmed   Block: 41   Gas used: 276741 (2.31%)
  ERC6551Registry deployed at: 0xD22363efee93190f82b52FCD62B7Dbcb920eF658

Transaction sent: 0x57efb9cd0d46b21b74ef8599d46a2523fec2265c8d79a86109b2f39f25e8ac4c
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 23
  ERC6551Account.constructor confirmed   Block: 42   Gas used: 971011 (8.09%)
  ERC6551Account deployed at: 0x4D1B781ce59B8C184F63B99D39d6719A522f46B5

Transaction sent: 0x6326e73139e419c2f39f0a7256bdc3b9d5d54c8eaa11bd5a5697efe10e17e5c1
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 24
  ERCAI.constructor confirmed   Block: 43   Gas used: 5118568 (42.65%)
  ERCAI deployed at: 0xf9C8Cf55f2E520B08d869df7bc76aa3d3ddDF913

Transaction sent: 0x9a15564e3a5cfe4404302de41ec3fff193c73a8282597808eb87aece5c1565d1
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 26
  ERCAI.launch confirmed   Block: 45   Gas used: 2384961 (19.87%)

Transaction sent: 0xc3ed4a860fbb73c751d440b84e5acd7fd33311f8b0da1d06579ef8dc7770fc64
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 1
  ERCAI.transfer confirmed   Block: 46   Gas used: 82097 (0.68%)

Transaction sent: 0x939f448c00f306d47f481dbbffe79637f4c3fe23f3a5808c07f46ce8c5c20c95
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 27
  ERCAI.liveNFTs confirmed   Block: 47   Gas used: 43007 (0.36%)

Transaction sent: 0xf80ef7a9cb7365837b038e56217080c10787a05458460d7370414ab14719ed68
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 6
  ERCAI.approve confirmed   Block: 48   Gas used: 46520 (0.39%)

Transaction sent: 0x7ff48236e5b7daa0ef936cac533c6b7d6ccd491592c45b883a4b10712c64e32d
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 10
  ERCAI.erc20TransferFrom confirmed   Block: 49   Gas used: 240030 (2.00%)

Transaction sent: 0x00027833192363b79d0bbda4c52e4e2b34c803f083fd23261f2017846c0968a2
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 7
  ERCAI.sendAgentMessage confirmed (Not authorized)   Block: 50   Gas used: 30244 (0.25%)

Transaction sent: 0xe8d791476c2fcb2b8696ace89753b97818b13cec67421059858582f68f85fb02
  Gas price: 0.0 gwei   Gas limit: 12000000   Nonce: 11
  ERCAI.sendAgentMessage confirmed   Block: 51   Gas used: 113044 (0.94%)

tests/test_ercai.py::test_agent_message PASSED
```

Annexes

Testing code:

Testing_AIToken:

```
from brownie import (

    reverts,

)


from scripts.helpful_scripts import (

    ZERO_ADDRESS,

    DAY_TIMESTAMP,

    get_timestamp,

    increase_timestamp,

    get_account,

    random_salt,

    get_chain_number,

)


from scripts.deploy import (

    # MOCK

    deploy_weth,

    deploy_router,

    deploy_factory,

    deploy_liquidity,

    # Contracts

    deploy_ercai

)
```

```python
def test_launch(only_local):
    # Arrange
    owner = get_account(0)
    other = get_account(1)
    extra = get_account(2)

    factory = deploy_factory(owner, owner)
    weth = deploy_weth(owner)
    router = deploy_router(owner, factory.address, weth.address)
    ercai = deploy_ercai(owner, random_salt(), router.address)

    # not owner
    with reverts():
        ercai.launch(1000000, True, {"from": other})

    # not enought balance
    with reverts():
        ercai.launch(1000000, True, {"from": owner})

    owner.transfer(ercai.address, "1 ether")
    tx = ercai.launch(1000000, True, {"from": owner})
    assert tx.events['Transfer'][0]['from'] == ZERO_ADDRESS
    assert tx.events['Transfer'][0]['to'] == ercai.address
    assert tx.events['Transfer'][0]['amount'] == 1000000e18

    with reverts("Already launched"):
        ercai.launch(1000000, True, {"from": owner})


def test_tasks(only_local):
    # Arrange

    owner = get_account(0)

    other = get_account(1)

    extra = get_account(2)


    factory = deploy_factory(owner, owner)

    weth = deploy_weth(owner)

    router = deploy_router(owner, factory.address, weth.address)

    ercai = deploy_ercai(owner, random_salt(), router.address)


    owner.transfer(ercai.address, "1 ether")

    tx = ercai.launch(1000000, True, {"from": owner})

    pair_addr = tx.events['Transfer'][1]['to']


    # send some tokens

    ercai.transfer(other, 2e18, {"from": pair_addr})


    ercai.liveNFTs({"from": owner})

    ercai.approve(extra, 2e18, {"from": other})

    tx = ercai.erc20TransferFrom(other, extra, 1e18, {"from": extra})

    assert tx.events['Transfer'][0]['from'] == other

    assert tx.events['Transfer'][0]['to'] == extra

    assert tx.events['Transfer'][0]['amount'] == 1e18


    token_id = tx.events['ERC6551AccountCreated'][0]['tokenId']


    with reverts("Deadline must be in the future"):

        ercai.createTask("some_description", 1, {"from": other})
    tx = ercai.createTask("some_description", get_timestamp(7), {"from": other})
    assert tx.events['TaskCreated'][0]['taskId'] == 0
    assert tx.events['TaskCreated'][0]['requester'] == other

    tx = ercai.createTask("some_description", get_timestamp(14), {"from": extra})
    assert tx.events['TaskCreated'][0]['taskId'] == 1
    assert tx.events['TaskCreated'][0]['requester'] == extra

    with reverts("Not agent owner"):
        ercai.assignTask(0, token_id, {"from": other})
    tx = ercai.assignTask(0, token_id, {"from": extra})
    assert tx.events['TaskAssigned'][0]['taskId'] == 0
    assert tx.events['TaskAssigned'][0]['agentId'] == token_id

    with reverts("Agent not assigned to task"):
        ercai.completeTask(1, token_id, b"outcome", {"from": extra})

    with reverts("Not authorized"):
        ercai.completeTask(0, token_id, b"outcome", {"from": other})

    with reverts("Not authorized"):
        ercai.completeTask(0, 2, b"outcome", {"from": extra})

    tx = ercai.completeTask(0, token_id, b"outcome", {"from": extra})
    assert tx.events['TaskCompleted'][0]['taskId'] == 0
    assert tx.events['TaskCompleted'][0]['agentId'] == token_id

    with reverts("Task already completed"):
        ercai.assignTask(0, token_id, {"from": extra})
```

```python
    with reverts("Task already completed"):
        ercai.completeTask(0, token_id, b"outcome", {"from": extra})

    increase_timestamp(DAY_TIMESTAMP * 20)


    with reverts("Task deadline passed"):
        ercai.assignTask(1, token_id, {"from": extra})


    with reverts("Task deadline passed"):
        ercai.completeTask(1, token_id, b"outcome", {"from": extra})


def test_agent_message(only_local):
    # Arrange
    owner = get_account(0)
    other = get_account(1)
    extra = get_account(2)


    factory = deploy_factory(owner, owner)
    weth = deploy_weth(owner)
    router = deploy_router(owner, factory.address, weth.address)
    ercai = deploy_ercai(owner, random_salt(), router.address)


    owner.transfer(ercai.address, "1 ether")
    tx = ercai.launch(1000000, True, {"from": owner})
    pair_addr = tx.events['Transfer'][1]['to']


    # send some tokens
    ercai.transfer(other, 2e18, {"from": pair_addr})
ercai.liveNFTs({"from": owner})

ercai.approve(extra, 2e18, {"from": other})

tx = ercai.erc20TransferFrom(other, extra, 1e18, {"from": extra})

assert tx.events['Transfer'][0]['from'] == other

assert tx.events['Transfer'][0]['to'] == extra

assert tx.events['Transfer'][0]['amount'] == 1e18


token_id = tx.events['ERC6551AccountCreated'][0]['tokenId']


with reverts("Not authorized"):

    ercai.sendAgentMessage(2, 3, b'message', {"from": other})


tx = ercai.sendAgentMessage(token_id, 3, b'message', {"from": extra})

assert tx.events['AgentMessageSent'][0]['fromTokenId'] == token_id

assert tx.events['AgentMessageSent'][0]['toTokenId'] == 3


messages = ercai.getAgentMessages(3, 0, 1, {"from": other})

assert len(messages) == 1
```

Technical Findings Summary

Findings

Vulnerability Level	Total	Not Fixed	Not Apply	Acknowledged	Partially Fixed	Fixed
🔴 High	1					1
🟠 Medium	3					3
🟡 Low	4					4
🟢 Informational	1					1

Assessment Results

Score Results

Review	Score
Global Score	**90/100**
Assure KYC	Not completed
Audit Score	85/100

The Following Score System Has been Added to this page to help understand the value of the audit, the maximum score is 100, however to attain that value the project must pass and provide all the data needed for the assessment. Our Passing Score has been changed to 84 Points for a higher standard, if a project does not attain 85% is an automatic failure. Read our notes and final assessment below. The Global Score is a combination of the evaluations obtained between having or not having KYC and the type of contract audited together with its manual audit.

Audit PASS

Following our comprehensive security audit of the token contract for the AIToken project, we inform you that the cybersecurity audit has failed due to multiple critical issues identified during the review, which pose significant risks to the contract's functionality and security. Immediate remediation is required to address these vulnerabilities.
After reviewing the issues, the development team applies all necessary corrective measures.

Disclaimer