



Lucky Train

Security Assessment

CertiK Assessed on Sept 10th, 2025





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Lucky Train

The security assessment was prepared by CertiK.

Executive Summary

TYPES

Jetton

ECOSYSTEM

TON (TON)

METHODS

Manual Review

LANGUAGE

FunC

TIMELINE

Preliminary comments published on 09/10/2025

Final report published on 09/10/2025

Vulnerability Summary



8

Total Findings

7

Resolved

1

Multi-Sig

0

Partially Resolved

0

Acknowledged

0

Declined



1 Centralization

1 Multi-Sig



Centralization findings highlight privileged roles & functions and their capabilities, or instances where the project takes custody of users' assets.



0 Critical

Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.



1 Major

1 Resolved



Major risks may include logical errors that, under specific circumstances, could result in fund losses or loss of project control.



0 Medium

Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.



4 Minor

4 Resolved



Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.



2 Informational

2 Resolved



Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

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Disclaimer

CODEBASE | LUCKY TRAIN

Repository

<https://gitlab.com/lucky-train/smart-contract/-/tree/9db7fa3d240c854cdc8c12d89ccaeba6c85e1a9c>

<https://gitlab.com/lucky-train/smart-contract/-/tree/2366e4307b4d3aeb062bf023782f694186671ba6/>

<https://gitlab.com/lucky-train/smart-contract/-/tree/82b8251eeee0e58c8b20eb7d056cdc727ff7cf4f/contracts/>

<https://gitlab.com/lucky-train/smart-contract/-/tree/b86451a91230bb02a6e8e8393ef816c2958150a3/contracts/>

Commit

[9db7fa3d240c854cdc8c12d89ccaeba6c85e1a9c](https://gitlab.com/lucky-train/smart-contract/-/tree/9db7fa3d240c854cdc8c12d89ccaeba6c85e1a9c)

[2366e4307b4d3aeb062bf023782f694186671ba6](https://gitlab.com/lucky-train/smart-contract/-/tree/2366e4307b4d3aeb062bf023782f694186671ba6)

[82b8251eeee0e58c8b20eb7d056cdc727ff7cf4f](https://gitlab.com/lucky-train/smart-contract/-/tree/82b8251eeee0e58c8b20eb7d056cdc727ff7cf4f)

[b86451a91230bb02a6e8e8393ef816c2958150a3](https://gitlab.com/lucky-train/smart-contract/-/tree/b86451a91230bb02a6e8e8393ef816c2958150a3)

Audit Scope

The file in scope is listed in the appendix.

APPROACH & METHODS | LUCKY TRAIN

This report has been prepared for Lucky Train to discover issues and vulnerabilities in the source code of the Lucky Train project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Testing the smart contracts against both common and uncommon attack vectors;
- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

FINDINGS | LUCKY TRAIN

8
Total Findings0
Critical1
Centralization1
Major0
Medium4
Minor2
Informational

This report has been prepared for Lucky Train to identify potential vulnerabilities and security issues within the reviewed codebase. During the course of the audit, a total of 8 issues were identified. Leveraging a combination of Manual Review the following findings were uncovered:

ID	Title	Category	Severity	Status
LUT-02	Centralization Related Risks	Centralization	Centralization	2/3 Multi-Sig
LUT-03	Incorrect Gas Handling Leads To Lost Stake	Incorrect Calculation	Major	Resolved
LUT-04	Missing <code>end_parse()</code> Validation Allows Unchecked References In <code>ticketParams</code>	Logical Issue	Minor	Resolved
LUT-05	Unsafe Handling Of Malformed <code>jetton::transfer_notification</code> Can Lead To Permanent Jetton Loss	Logical Issue	Minor	Resolved
LUT-06	Usage Of Same <code>op</code> For Different Messages Breaks Message Parsing	Coding Issue	Minor	Resolved
LUT-07	Incorrect Gas Handling In <code>op::withdrawTeam</code> Handler	Volatile Code	Minor	Resolved
LUT-08	Presence Of <code>TODO</code> Comments And Commented Code	Coding Style	Informational	Resolved
LUT-09	Typos	Coding Style	Informational	Resolved

LUT-02 | Centralization Related Risks

Category	Severity	Location	Status
Centralization	● Centralization	contracts/staking.fc (base): 7	● 2/3 Multi-Sig

Description

In the contract `staking` the role `storage::owner` has authority over the functions

- `op::debug::setall`, `op::debug::setcode`
- `op::withdrawTeam`
- `op::setDistributeData`, `op::setPaused`, `op::setManager`, `op::removeManager`, `op::setTicketParams`, `op::changeOwner`
- `op::setJettonWallet`

Any compromise to the `storage::owner` account may allow the hacker to take advantage of this authority and

- extract all the fees
- change the contract code to extract all the locked funds
- change staking parameters
- before `op::setJettonWallet` message the `storage::owner` can send fake `op::jetton::transfer_notification` message and break contract invariants

Recommendation

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., multisignature wallets. Indicatively, here are some feasible suggestions that would also mitigate the potential risk at a different level in terms of short-term, long-term and permanent:

Short Term:

Timelock and Multi sign (2/3, 3/5) combination *mitigate* by delaying the sensitive operation and avoiding a single point of key management failure.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
AND
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key compromised;
AND

- A medium/blog link for sharing the timelock contract and multi-signers addresses information with the public audience.

Long Term:

Timelock and DAO, the combination, *mitigate* by applying decentralization and transparency.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
AND
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.
AND
- A medium/blog link for sharing the timelock contract, multi-signers addresses, and DAO information with the public audience.

Permanent:

Renouncing the ownership or removing the function can be considered *fully resolved*.

- Renounce the ownership and never claim back the privileged roles.
OR
- Remove the risky functionality.

I Alleviation

[Lucky Train, 07/01/2025]: The team acknowledged the issue and decided to use <https://multisig.ton.org/>.

[CertiK, 09/10/2025]:

The team has deployed the staking contract at address [EQB9M1I392BBx5SLTzv56GKwYLnHB9IrZAxjWg3Bjl_LUCKY](#).

The multisig address [EQARY2MymBnGVU8Z1Yt1H0HrE3JDLN23W6jInKCN42WpjXCQ](#) was deployed with:

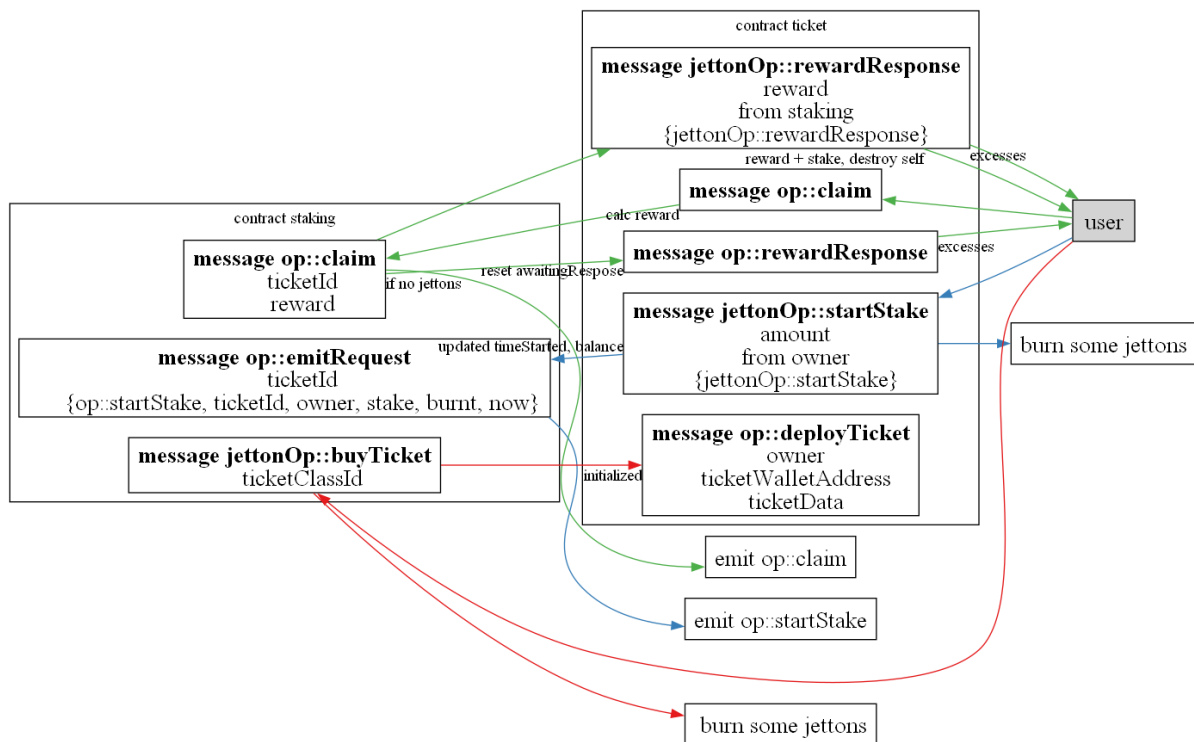
1. Threshold: 2/3
2. Signers: #1 — UQBfdHfP72dR6i6e7qQL4n3X-wBkIH7S6NN8tjAVAgcSGxUA, #2 — UQBV45tJRLF9clr1ZnPmIFElj8q0p3N0NfXwpT9MOH21D4Pu, #3 — UQBjlpXzToDtO1OkJMeR9ufezWreytHwuL4Kc-U2Sf_3aznX

At the transaction [15e6469369347a543305277f0d596d5334882d5bd7f6e3ef89422981bb597601](#), the owner of the staking contract was assigned to the multisig address [EQARY2MymBnGVU8Z1Yt1H0HrE3JDLN23W6jInKCN42WpjXCQ](#).

LUT-03 Incorrect Gas Handling Leads To Lost Stake

Category	Severity	Location	Status
Incorrect Calculation	Major	contracts/ticket.fc (base): 272	Resolved

Description



```

271 msg::send(
272     100000000, ;; Fixed gas amount
273     storage::staking,
274     begin_cell()
275         .store_uint(op::claim, 32)
276         .store_uint(ctx::query_id, 64)
277         .store_uint(storage::ticketId, 64)
278         .store_coins(reward)
279         .end_cell(),
280     SEND_MODE_CARRY_ALL_REMAINING_MESSAGE_VALUE ;; Forward all remaining
281 );

```

The code snippet shows a `msg::send()` operation that both specifies a fixed gas amount (10000000) and uses `SEND_MODE_CARRY_ALL_REMAINING_MESSAGE_VALUE`. This creates a contradiction in gas handling behavior.

The `SEND_MODE_CARRY_ALL_REMAINING_MESSAGE_VALUE` flag indicates that all remaining message value should be forwarded, making the explicit gas amount redundant. The operation will spend the contract own balance and can fail in case of lack of gas.

`op::buyTicket` handler in staking contract requires 0.045 tons of gas. However, it

1. sends 0.020 with `op::deployTicket`
2. spends tons for 2 messages forwarding and 1 event emitting
3. spends tons for `op::buyTicket` processing
4. sends 0.031 with `op::burn`

Burn operation returns 0.025 tons as excesses, however, staking contract should not rely on that, since the jetton can have custom burning logic.

`op::claim` handler in ticket contract requires 0.100 tons of gas. However,

1. it sends 0.106 with `op::claim` to staking contract (more, than received)
2. staking contract transfers reward jettons with 0.096 tons attached, with **only 0.036 tons** with `op::rewardResponse`
`transfer_notification`
3. the excesses from this sending are returned to staking contract. It is expected to be returned to the ticket owner.
4. 0.036 tons with `op::rewardResponse` `transfer_notification` is not enough to process the message by ticket contract, since it sends jettons to the user with 0.045 tons attached.
5. As a result, the claim process can fail with not enough tons leaving the ticket contract with `storage::awaitingResponse` set.

Scenario

To reproduce the failed claim scenario:

1. Edit in tests/StakingE2E.spec.ts the scenario 'should buy ticket and claim in one year'
2. At L820 use `blockchain.now = blockchain.now! + 1.5*oneYear + 3600`
3. The actual result: `jettonOp::rewardResponse` handler in ticket contract keeps all jettons and stays in `awaitingResponse` state.

Recommendation

Remove the explicit gas amount (10000000) when using `SEND_MODE_CARRY_ALL_REMAINING_MESSAGE_VALUE` to align with the expected behavior of forwarding all remaining value.

Carefully check all the gas requirements.

LUT-04 | Missing `end_parse()` Validation Allows Unchecked References In `ticketParams`

Category	Severity	Location	Status
Logical Issue	● Minor	contracts/staking.fc (base): 455~458	● Resolved

Description

```
456 if (ticketParams.slice_bits() > 0) {  
457     throw(err::staking::invalidTicketData);  
458 }
```

The current validation only checks for remaining bits in `ticketParams` using `slice_bits()`, but fails to verify that the slice contains no references. This could allow malformed data with references to pass validation.

Using `end_parse()` would properly validate that:

1. No bits remain unparsed
2. No cell references remain unparsed
3. The entire ticket data structure has been properly consumed

Recommendation

Replace the `slice_bits()` check with `end_parse()`.

LUT-05 Unsafe Handling Of Malformed `jetton::transfer_notification` Can Lead To Permanent Jetton Loss

Category	Severity	Location	Status
Logical Issue	● Minor	contracts/staking.fc (base): 131; contracts/ticket.fc (base): 95	● Resolved

Description

The system fails to properly handle cases where the `jetton::transfer_notification` is in an incorrect format. When parsing fails due to malformed input, jettons become permanently locked as the contract doesn't implement a recovery mechanism for this edge case.

Specifically the jettons are locked in cases:

1. If the `forward_payload` is empty.
2. If jettons are of unexpected type (not from `storage::jettonWallet`).
3. If `ctx::jettonOp` has unexpected value.
4. If jettons arrive not from `storage::owner` / `storage::staking`.
5. If `storage::timeStarted` is in unexpected state.

Recommendation

Use try-catch pattern to handle parsing failures gracefully and return jettons back.

LUT-06 | Usage Of Same `op` For Different Messages Breaks Message Parsing

Category	Severity	Location	Status
Coding Issue	Minor	contracts/ticket.fc (base): 169, 192, 275	Resolved

Description

The code uses the same `op` s (like `op::rewardResponse`) for different message types with different formats. This creates ambiguity in message handling and prevents proper automatic parsing by blockchain explorers and indexers.

Each message type should have a unique `op` to ensure clear differentiation and reliable parsing. Currently, using the same `op` for multiple purposes makes it impossible for external systems to distinguish between different message types programmatically.

```
191 begin_cell()
192   .store_uint(op::jetton::excesses, 32) ;; Operation
193   .end_cell(),
```

According to [TEP-074 standard](#) `op::jetton::excesses` message is supposed to contain `query_id` field.

Recommendation

Assign unique operation IDs to each distinct message type. For example:

- `op::rewardResponseOk`
- `op::rewardResponseFail`

LUT-07 | Incorrect Gas Handling In `op::withdrawTeam` Handler

Category	Severity	Location	Status
Volatile Code	● Minor	contracts/staking.fc (base): 291	● Resolved

Description

`op::withdrawTeam` handler of staking contract sends `op::jetton::transfer` message with 0.042 tons attached. But it doesn't check if enough gas was provided. As a result, own contract balance can be spent.

Recommendation

We recommend using `SEND_MODE_CARRY_ALL_REMAINING_MESSAGE_VALUE` or ensuring enough gas was provided.

LUT-08 | Presence Of `TODO` Comments And Commented Code

Category	Severity	Location	Status
Coding Style	● Informational	contracts/imports/messages.fc (base): 41; contracts/imports/utls.fc (base): 35~36; contracts/staking.fc (base): 114, 327, 514; contracts/ticket.fc (base): 181~182, 217	● Resolved

Description

The code contains `TODO` comments (`;; TODO: calculate gas`), commented-out code, and debug functionality. This indicates unfinished work and should be addressed before deployment.

```
35 ;; global int storage::isInitiated;           ;; 2 is initied
36 ;; global int storage::isStarted;             ;; 2 is started
```

"2" is supposed to be "1". `isStarted` is supposed to be `awaitingResponse` .

```
181           1,                               ;; Query ID
```

"Query ID" is supposed to be "Forward TON amount".

Recommendation

Ensure all development artifacts are cleaned up before production deployment

LUT-09 | Typos

Category	Severity	Location	Status
Coding Style	● Informational	contracts/ticket.fc (base): 13	● Resolved

Description

The variable name `awaitingResponse` is supposed to be `awaitingResponse` .

Recommendation

We recommend fixing the typos.

OPTIMIZATIONS | LUCKY TRAIN

ID	Title	Category	Severity	Status
LUT-01	Constants Can Be Used Instead Of PUSHINT	Gas Optimization	Optimization	● Resolved

LUT-01 | Constants Can Be Used Instead Of `PUSHINT`

Category	Severity	Location	Status
Gas Optimization	● Optimization	contracts/imports/utils.fc (base): 3; contracts/jtnimports/constants.fc (base): 2~14	● Resolved

Description

```
3 int workchain() asm "0 PUSHINT";
```

According to the [documentation](#), numeric constants are substituted during compilation, so all optimization and pre-computations performed during the compilation are successfully performed (unlike the old method of defining constants via inline asm `PUSHINT`s).

Recommendation

We recommend declaring the constants.

APPENDIX | LUCKY TRAIN

Audit Scope

lucky-train/smart-contract

-  contracts/imports/messages.fc
-  contracts/imports/utils.fc
-  contracts/jtnimports/constants.fc
-  contracts/staking.fc
-  contracts/ticket.fc
-  contracts/imports/constants.fc
-  contracts/imports/stdlib.fc
-  contracts/jtnimports/discovery-params.fc
-  contracts/jtnimports/jetton-utils.fc
-  contracts/jtnimports/op-codes.fc
-  contracts/jtnimports/params.fc
-  contracts/jtnimports/stdlib.fc
-  contracts/jtnimports/utils.fc
-  contracts/xbrc20token.fc

Finding Categories

Categories	Description
Gas Optimization	Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Categories	Description
Coding Style	Coding Style findings may not affect code behavior, but indicate areas where coding practices can be improved to make the code more understandable and maintainable.
Coding Issue	Coding Issue findings are about general code quality including, but not limited to, coding mistakes, compile errors, and performance issues.
Incorrect Calculation	Incorrect Calculation findings are about issues in numeric computation such as rounding errors, overflows, out-of-bounds and any computation that is not intended.
Volatile Code	Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases and may result in vulnerabilities.
Logical Issue	Logical Issue findings indicate general implementation issues related to the program logic.
Centralization	Centralization findings detail the design choices of designating privileged roles or other centralized controls over the code.

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