# **Testing Report**



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| **Date:** Seville October 12, 2025 |

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# **Revision Table**

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| **Revision Number** | **Date** | **Description** |
| 1.0 | 25/05/2025 | Intial version – all sections added |
| 2.0 | 02/07/2025 | Revamped tests and updated performance testing statistics |
| 3.0 | 12/10/2025 | Revamped tests again and updated performance testing statistics |

# **Introduction**

The purpose of this document is to provide an analysis of the various tests that have been carried out to assess code coverage related to Student 4, as well as an analysis of the system's performance with respect to the requirements associated with that student.

# **Contents**

## **Functional Testing**

The following is a list of functional tests performed for the entity Claim:

* list-show.safe: Verifies the functionality of listing claims associated with an agent and displaying the full details of each claim belonging to agent1.
* create.safe: Tests claim creation using valid input data. Also includes negative tests with missing or invalid values to ensure appropriate error handling.
* delete.safe: Ensures that claims associated with agent1 can be deleted successfully, and that related entities are removed accordingly.
* publish.safe: Tests the publish service, including validations similar to those in the create and update operations.
* update.safe: Validates the update functionality by testing both successful updates with valid data and failures with invalid or incomplete inputs.
* authorisation.hack: Performs security testing across all endpoints (create, update, delete, list, show, and publish) by simulating unauthorized access attempts using invalid IDs, missing fields, and unauthorized requests.
* null.hack: Tests the system’s behavior when null values are provided for various attributes, ensuring proper validation and error handling.

The test coverage achieved for the entity Claim is 97.2%.

Interfaz de usuario gráfica

El contenido generado por IA puede ser incorrecto.

The missing lines are mostly comprised of double checks that as of the current state of the project cannot be executed, but are still useful in case that the project is updated in the future.

The following is a list of functional tests performed for the entity TrackingLog:

* list-show.safe: Verifies the functionality of listing tracking logs associated with a claim and displaying detailed information for each log entry linked to agent1.
* create.safe: Tests the creation of tracking logs with valid input data, as well as validation checks for missing or incorrect data
* delete.safe: Ensures that tracking logs can be deleted correctly and that associated cleanup behavior is properly handled.
* publish.safe: Tests the publish operation of tracking logs, including validations and expected system behavior upon publishing.
* update.safe: Validates the update process, checking both successful updates and failures due to invalid or incomplete data.
* authorisation.hack: Conducts comprehensive security testing by simulating unauthorized access attempts across all services (create, update, delete, list, show, and publish) using invalid IDs, unauthorized users, and malformed requests.

The test coverage achieved for the entity TrackingLog is 97.4%.

Interfaz de usuario gráfica

El contenido generado por IA puede ser incorrecto.

Imagen que contiene Escala de tiempo

El contenido generado por IA puede ser incorrecto.All lines of this entity have been tested either fully or partially, except for lines that are executed only if the trackingLog doesn’t have an associated Claim. This would be an exceptional case and is currently impossible to replicate, but it is good to have those kinds of checks nonetheless in case anything unexpected may happen after any changes to the code.

## **Performance Testing**

A performance analysis of the system will now be carried out through the execution of the previously mentioned functional tests. The tests have been executed under two different scenarios:

* Without indexes for query optimization: The Excel file “tester-performance-clean-no-index-v3.xlsx” contains the average performance results of the test operations as illustrated in the following chart.

Gráfico, Gráfico de barras

El contenido generado por IA puede ser incorrecto.

As observed, the most time-consuming operation on average is the publishing of claims, which takes more than 30 milliseconds.

Below are some statistics regarding the operations:

Aplicación, Tabla, Excel

El contenido generado por IA puede ser incorrecto.

As we can observe, the system without indexes gives a confidence interval ranging from 9.3 milliseconds to 11.6 milliseconds.

* With indexes for query optimization: The Excel file “tester-performance-clean-index-v3.xlsx” contains the average performance results of the test operations, as illustrated in the following chart.

Gráfico, Gráfico de barras

El contenido generado por IA puede ser incorrecto.

As we can see, the operation that takes the most time is still the publishing of claims. There doesn't appear to be a significant change in the performance of any operation.

Below are some statistics regarding the operations:

Interfaz de usuario gráfica, Aplicación, Tabla, Excel

El contenido generado por IA puede ser incorrecto.

As we can observe, the system with indexes gives a confidence interval ranging from 8.2 milliseconds to 10.2 milliseconds.

Next, using both confidence intervals, a hypothesis test will be conducted using a z-test. This test is documented in the file “z-test-v3.xlsx”:

Tabla

El contenido generado por IA puede ser incorrecto.

The pvalue obtained from the z-test is 0,1175879. This value is greater than alpha, which in this case is 0.05. We can conclude that the changes are not significant enough in terms of system performance.

# **Conclusion**

Over 97% of the code related to Student 4 has been tested, enabling the detection and correction of bugs that were not initially apparent. Additionally, it has been statistically demonstrated that the requirements implemented by this student meet the non-functional requirement that the system, on average, takes less than one second to perform operations on the entities TrackingLog and Claim, improving the user experience when interacting with the system.

# **Bibliography**

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