# **Testing Report**



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# **Revision Table**

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| **Revision Number** | **Date** | **Description** |
| 1.0 | 25/05/2025 | Intial version – all sections added |

# **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: This test checks the functionality of listing the claims of an agent and showing the specific content of all the entities belonging to agent1.
* Create.safe: Several claims are created using valid test data accepted by the system. An attempt is made to create a claim without providing any information (returning the corresponding error messages), and finally, some valid data is added along with various invalid values.
* Delete.safe: All claims of agent1 are removed, and it is verified that the entities related to those claims are also deleted.
* Delete-unbind.safe: The unbind feature of the delete service for claims is tested by perfoming a GET request to the corresponding endpoint.
* Update-publish.safe: The same validation testing as in the create functionality is performed in both the update and publish services.
* Update.safe: Some more testing is performed for the update service that was left out in the previous file.
* Authorisation.hack: Every possible hacking attempt is performed on all services by conducting tests using invalid IDs in the URL, empty fields, unauthorised requests, etc. This is tested across multiple operations, including show, update, delete, create, list, and publish.

The test coverage achieved for the entity Claim is 98.4%.

Gráfico

El contenido generado por IA puede ser incorrecto.

All lines of this entity have been tested either fully or partially, with the partial lines being comprised of double checks that as of the current state of the project will never be executed, but are a good practice nonetheless since they could be crucial in the case that the codebase is changed in the future.

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

* List-show.safe: This test checks the functionality of listing the tracking logs of a claim and showing the specific content of all the entities belonging to agent1.
* Crud.safe All test files per functionality have instead been consolidated into a single crud.safe file, where the full suite of tests is executed together. This unified file includes tests for creating, listing, updating, deleting, and publishing.
* Authorisation.hack: Every possible hacking attempt is performed on all services by conducting tests using invalid IDs in the URL, empty fields, unauthorised requests, etc. This is tested across multiple operations, including show, update, delete, create, list, and publish.

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

Interfaz de usuario gráfica, Aplicación

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, especially considering that the codebase would be continuously updated in the real world.

## **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.xlsx” contains the average performance results of the test operations as illustrated in the following chart.

As observed, the most time-consuming operation on average is the creation of claims, which takes more than 35 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.xlsx” contains the average performance results of the test operations, as illustrated in the following chart.

As we can see, the most time consuming operation on average is still the claim creation, which takes now takes less than 35 milliseconds. All operations have decreased their response time compared to the previous analysis. However, there doesn't appear to be a significant change in their performance.

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.xlsx”, with supporting screenshots provided below:

Interfaz de usuario gráfica, Aplicación, Tabla

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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 95% 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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