

Verification and Validation Report: McMaster Engineering Society Custom Financial Expense Reporting Platform

Team #12, Reimbursement Rangers

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1 Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

2 Symbols, Abbreviations and Acronyms

symbol	description
T	Test

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3 Functional Requirements Evaluation

4 Nonfunctional Requirements Evaluation

4.1 Usability

4.2 Performance

4.3 etc.

5 Comparison to Existing Implementation

This section will not be appropriate for every project.

6 Unit Testing

Most files, excluding the 3rd-party library, top-level and GUI modules had corresponding unit tests. All tests were performed using jest for testing javascript, and each commit to the main branch must pass all the tests. All the tests passed as seen in the Test Report [12.1](#).

7 Changes Due to Testing

8 Automated Testing

The tests were set up to automatically run in GitHub Actions whenever a commit was pushed to the `main` branch. The configuration for the CI/CD automation can be found at <https://github.com/ausbennett/mes-finance-platform/blob/main/.github/workflows/test.yml> and the test pipeline can be viewed at <https://github.com/ausbennett/mes-finance-platform/actions/workflows/test.yml>.

9 Trace to Requirements

9.1 Trace table

Test Suite	Functional Requirement
emailer.test.js	FR1.5, FR3.2
reconciler.test.js	FR1.1, FR1.4, FR1.6, FR1.9, INR1, SPLR1-3
requests.test.js	FR1.2, FR1.3, FR1.8, PVR1
Account management test suite (TBD)	FR1.7, FR3.1, FR3.2
Usability testing (via check- list)	APR1, APR2, STYR1, STYR2, EUR1-3, PIR1, LER2, UAPR1, ACSR1, SCR1-5, CLTR1
Static analysis (via check- list)	POAR1, LOR1, WR1, RLR1, ACSR2, MR2, SR1, LR1, LR2, STR1
Load testing	CPR1-3, SER2

Table 1: Mapping between test suites and requirements

10 Trace to Modules

Test Suite	Module
emailer.test.js	Notification Module (M4), Authentication Module (M6), EMailer API (M7)
reconciler.test.js	Clubs, User, Request Database(M10-12)
requests.test.js	Requests Module(M3), Re- quests Controller (M9)
Account management test suite (TBD)	Account Management Mod- ule (M2), User Dashboard Module (M5), Account Management Controller (M8)
Usability testing (via check- list)	Graphical User Interface (M13)

Table 2: Mapping between test suites and modules

11 Code Coverage Metrics

12 Appendix

12.1 Test Report

```
PASS tests/requests.test.js
  Request Endpoints and Model Validations
    Model Validations
      should require necessary reimbursement fields (3 ms)
    Reimbursement Endpoints
      should create reimbursement with file upload (34 ms)
```

```
Test Suites: 1 passed, 1 total
Tests:       2 passed, 2 total
```

Snapshots: 0 total
Time: 0.927 s, estimated 1 s
Ran all test suites.

Appendix — Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Reflection.

The purpose of reflection questions is to give you a chance to assess your own learning and that of your group as a whole, and to find ways to improve in the future. Reflection is an important part of the learning process. Reflection is also an essential component of a successful software development process.

Reflections are most interesting and useful when they're honest, even if the stories they tell are imperfect. You will be marked based on your depth of thought and analysis, and not based on the content of the reflections themselves. Thus, for full marks we encourage you to answer openly and honestly and to avoid simply writing "what you think the evaluator wants to hear."

Please answer the following questions. Some questions can be answered on the team level, but where appropriate, each team member should write their own response:

1. What went well while writing this deliverable?

In this deliverable, leveraging tools like GitHub Actions for automated testing helped us streamline validation. Additionally, having already incorporated feedback from the V&V Plan, it made the process of creating the V&V Report much easier. From delegating roles to having pre-made checklists for usability testing, using the V&V Plan made our lives much easier.

2. What pain points did you experience during this deliverable, and how did you resolve them?

A significant challenge was designing a test suite that remains relevant as the project evolves. Since some core features are still in development, early tests risked becoming obsolete as APIs and interfaces changed. To address this, we prioritized testing isolated modules (e.g., database schemas, utility functions) with stable contracts and used mocking for incomplete subsystems. We also adopted a CI/CD-driven iterative approach, updating tests incrementally alongside implementation sprints

to ensure alignment while preserving test value.

3. Which parts of this document stemmed from speaking to your client(s) or a proxy (e.g. your peers)? Which ones were not, and why?

The usability testing checklist was shaped by stakeholders as our supervisor has been vocal about which features should have a bigger focus on usability rather than expanding the functionality. Other things, such as our automated testing strategy, were internally designed. From the testing we did before the Rev0 demo, we are already aware of which areas require more rigorous testing compared to other features.

4. In what ways was the Verification and Validation (VnV) Plan different from the activities that were actually conducted for VnV? If there were differences, what changes required the modification in the plan? Why did these changes occur? Would you be able to anticipate these changes in future projects? If there weren't any differences, how was your team able to clearly predict a feasible amount of effort and the right tasks needed to build the evidence that demonstrates the required quality? (It is expected that most teams will have had to deviate from their original VnV Plan.)