

Reflection and Traceability Report on SyncMaster

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1 Changes in Response to Feedback

Throughout the capstone project, many items of feedback were received and used to improve the quality of the application. The tables in the following section itemize each item of feedback and describes the pull request or issue in which it was addressed. Github issues proved to be an immensely useful tool for tracking and responding to feedback here, along with enabling discussions within the team.

1.1 SRS and Hazard Analysis

TA	Task - TA SRS Feedback - Prioritize requirements	Provided a priority of requirements which was then used to guide the development as we first implemented the high priority requirements. Merged in PR #429	#217
TA	Task - TA SRS Feedback - Add assumption City practices don't change and add traceability visualization	Added traceability matrix as suggested in PR #284	#216
TA	Task - TA SRS Feedback - Elaborate on integrity in requirements	Elaborated on requirements such as integrity per feedback in PR #284	#215

TA	Task - TA SRS Feedback - Cite Volere template	Cited the Volere template in SRS per feedback in PR #284	#214
TA	Task - TA Problem Statement Feedback - Goal Content	Demoted goals as documented on github in PR #474	#156
Peer Review	Peer Review - Dates in Roadmap	Added a specific date for imple- mentation in PR #429	#195
Peer Review	Peer Review - Secu- rity Requirement in FMEA Table	Added traceability to SR-AR1 for identified failure mode. Some functional requirements are there because they are traceable to the safety risk, they don't necessar- ily need to be in the safety re- quirement section. A new safety requirement was identified dur- ing the FMEA process and was added to the specific requirement section. Closed in PR #429	#194
Peer Review	Peer Review - FMEA Table Miss- ing Notification Design function	The project requirements have since evolved and the notification system will be a front-end page which queries the logs gathered from the already identified de- sign functions in the table. This particular module would not in- hibit the use of the system, loss of data, unauthorized access, or harm to users, so will not include as a hazard of its own. Closed without PR	#192
Peer Review	Peer Review - Con- flict between User Authentication and FMEA Table	Elaborated on how AWS Cognito is the application interfaced with in PR #429	#177
Peer Review	Peer Review - Scope not clearly defined	Added statement that the scope covers the outlined system com- ponents in PR #429	#175
Peer Review	Peer Review - Lack of Clarity For Potential Losses within Scope and Purpose	Added justification for why spe- cific losses would occur in PR #429	#174

Peer Review	Peer Review - Unclear Goal Description	Immediately directing the user to the problem statement where the project is described in much more detail was intentional to minimize repeating of information in more than one document. It makes maintaining the documents easier as when an element of the project changes there are fewer places it will need updating. Closed without PR	#141
Peer Review	Peer Review - Rationale for Performance Requirements	Elaborated on choice of numbers per feedback in PR #284	#140
Peer Review	Peer Review - Missing Traceable Requirements	Duplicate feedback with issue #216, refer to that issue	#139
Peer Review	Peer Review - Longevity Requirements (What not How)	Included suggested change in PR #284	#138
Peer Review	Peer Review - Phase In Plan	Completing the functional requirements are the main objective, and user testing will help to establish the non-functional requirements. Meeting with the City to be arranged in January. Included another point in the Project Planning Subsection. Closed in PR #284	#137
Peer Review	Peer Review - Verifiability of Speed and Latency Requirements	PR-SL2 removed previously due to elimination of SharePoint integration from scope of work. Added verbiage to identify ordinary application use cases for SL1 and SL3. Closed in PR #284	#136

Peer Review	Peer Review - Missing Terms in Glossary	Added the suggested acronyms for GPS, MySDS, and Sharepoint. The various users are defined in detail in section 2 of the document so excluded that term from the glossary. Closed in PR #284	#135
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1.2 Design and Design Documentation

Peer Review	Peer Review - [Design Doc] Module Uses	The team has decided not to put any AWS services/SDKs in the module guide as it was determined that it serves no purpose. The documentation for these services are freely available and it would probably be worse for us to write this documentation as we are not the designers and developers for these services. To address the issue, we have provided links in the appendix of the MIS to link the reader to such relevant documentation. Closed in PR #607	#358
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1.3 VnV Plan and Report

Peer Review	Peer Review - [VnV Plan] Inconsistency in Non-Functional Requirement TC-EU-2	Removed the undo statement in PR #474	#262
Peer Review	Peer Review - [VnV Plan] Explicitly State Individual Team Member(s) Roles	Outlining in the development plan, team member leading reviews and discussions varied depending on the subject at hand. Closed in PR #474	#261
Peer Review	Peer Review - [VnV Plan] More Diverse Team Roles	Elaborated on team roles in the development plan in PR #474	#260

Peer Review	Peer Review - [VnV Plan] Incorrect Initial states of several Non-Functional Requirements	Corrected the issue as described in PR #429	#259
Peer Review	Peer Review - [VnV Plan] Team role table is in the incorrect section	Corrected the location of the team role table in PR #429	#258
Peer Review	Peer Review - [VnV Plan] Design Verification Plan Inclusion	Added the noted idea into PR #429	#257
Peer Review	Peer Review - [VNV Report] Trace to Requirements	Trace to modules already exists, closed in PR #601	#487
Peer Review	Peer Review - [VNV Report] Trace to Requirement	Added links per suggestion in PR #601	#486
Peer Review	Peer Review - [VNV Report] Functional Requirement Evaluation	Added pass and fail details in PR #601	#485
Peer Review	Peer Review - [VNV Report] Usability	Phase 1 and Phase 2 are not two phases of the same test, rather the testing of each of the two portals. Closed in PR #601	#484
Peer Review	Peer Review - [VNV Report] Nonfunctional Requirement Evaluation	Trace to SRS provided in document, closed in PR #601	#483
Peer Review	Peer Review - [VNV Report] Non-Functional Tests	Added pass information in PR #601	#482

2 Challenge Level and Extras

2.1 Challenge Level

The challenge level for this project was a general challenge level.

2.2 Extras

The extras for this project are a user manual and a usability testing report. They can be found within the Extras folder in the GitHub repository [here](#).

3 Design Iteration (LO11 (PrototypeIterate))

The design of the SyncMaster application evolved repeatedly over the course of its development. The primary driver of this evolution was how the initial requirements changed after meetings with the stakeholder and constraints and challenges that were not originally foreseen came to be known.

First, one of the original ideas in the project was to integrate the file syncing aspect of the application directly into the city's SharePoint. This would have had the benefit of enabling the stakeholder to use an existing tool which they were familiar with. However, discussing this with the stakeholder allowed for the discovery that it was against the City policy to connect any external application into the City network. This was an important discovery which shaped the first iteration of the design.

Another factor which evolved was changing from tracking jobs which are performed to only tracking specific site visits. This came about when demonstrating our rev0 prototype to the stakeholder, and discussing many complexities which arise from trying to track a job across many visits, and how this introduces feature creep as the project evolves into a work order system which was never the original intention of the application.

Finally, there was also discussion after rev0 and before rev1 about the idea of there being a visitor account in order to reduce the administrative burden which comes with account management. We produced flowcharts illustrating the concept for the stakeholder, but came to realize that a visitor account would enable any member of the public access into the system. In discussion with them, we evolved the requirements to only allow authorized users into the system, ultimately discarding the visitor account.

4 Design Decisions (LO12)

Limitations:

5 Economic Considerations (LO23)

[Is there a market for your product? What would be involved in marketing your product? What is your estimate of the cost to produce a version that you could sell? What would you charge for your product? How many units would you have to sell to make money? If your product isn't something that would be sold, like an open source project, how would you go about attracting users? How many potential users currently exist? —TPLT]

This application is tailor made specifically for the City of Hamilton, with no intention on marketing it to other users at this time. There is certainly a demand for an application of this nature due to the current challenges faced without the existence of an application with the specific features included in SyncMaster. One attraction of this application is its low cost of maintenance. The below table outlines the projected cloud computing costs of maintaining the application.

File attachments and documents	5 GB free storage, then \$0.023 per GB per month
Database	25 GB free storage, then \$0.25 per GB per month
Compute/API	Can handle 1 million requests per month for free, not expected to exceed
Users	10000 monthly users free per month, not expected to exceed
Domain name	expected to be \$20 per year for a domain name

If the City decides to use this application going forward, they would be guided by their internal procurement policies. Likely, this will involve the tendering of a service contract to procure services for the maintenance of the application. Bids for these contracts can vary widely in price, but estimating it to cost a few thousand dollars for occasional maintenance and upkeep is a safe budget.

6 Reflection on Project Management (LO24)

[This question focuses on processes and tools used for project management. —TPLT]

6.1 How Does Your Project Management Compare to Your Development Plan

[Did you follow your Development plan, with respect to the team meeting plan, team communication plan, team member roles and workflow plan. Did you use the technology you planned on using? —TPLT]

6.2 What Went Well?

[What went well for your project management in terms of processes and technology? —TPLT]

6.3 What Went Wrong?

[What went wrong in terms of processes and technology? —TPLT]

6.4 What Would you Do Differently Next Time?

[What will you do differently for your next project? —TPLT]

7 Reflection on Capstone

[This question focuses on what you learned during the course of the capstone project. —TPLT]

7.1 Which Courses Were Relevant

[Which of the courses you have taken were relevant for the capstone project? —TPLT]

7.2 Knowledge/Skills Outside of Courses

[What skills/knowledge did you need to acquire for your capstone project that was outside of the courses you took? —TPLT]