
Software Requirements Specification

for

Logfile Analysis Framework (LOAFR)

Version 1.0 approved

Prepared by Wil Bishop, Anakin Nolette, Trent Young, Ashlyn Pietrowski

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Revision History

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1. Introduction

1.1 Purpose

The product these requirements are for is a Log-file analysis framework (LOAFR). It is being created to aid in analyzing and reviewing data logs. The program shall allow the company to adopt a common data logging format and have automated tools to reduce error and time. The LOAFR system shall be able to search, sort, filter, add, save, load, and manipulate the data in the log-files. The LOAFR system shall be easy for engineers to use, with a complete UI and documentation on how to use the system. All of these components shall allow the company to save money on resources devoted to the log-file system and produce log-files more consistently.

1.2 Document Conventions

The standard font for this SRS document is Times New Roman, 11pt font. Requirements and features are listed in order of priority; the higher the requirement or feature is to the title, the greater its importance. Each requirement or feature statement has its own priority. Bolded text is meant for the user to spot out the most important item in a block of text. Italicized text highlights items of importance.

1.3 Intended Audience and Reading Suggestions

This document contains high and low level descriptions of the system that shall be developed. This document is primarily intended for the customer in question. Developers, software engineers, managers, users, testers, and other staff shall be able to read this document and understand the goals and objectives of the software system. This document is organized such that it is best read top to bottom, as the introduction and over-all descriptions provide a high level overview of the system before getting into the specifics in section 4. Readers who are not familiar with software development as a whole would benefit from only reading the introduction and overall description sections. Any reader familiar with software development would gain the most knowledge from reading the whole document.

1.4 Product Scope

The software being developed is meant to speed up the analysis and review of the data logs that are being created for testing purposes. The software shall create log-files more accurately and efficiently than manually created log-files. Some specific goals of the system include:

- It shall standardize the data logging format and the customer shall ensure that their test systems are updated so that they conform to the format
- It shall provide a flexible way to add new data sources and data items so that the components and the test environment can evolve independently
- It shall not place any undue restrictions on the kinds and variety of data that gets logged
- It shall provide easy and powerful mechanisms to sort, search, filter the data logs so that system engineers can look for patterns in the data logs
- The software shall be usable both interactively and in a batch processing mode

- The tool shall be usable on typical engineering workstations (desktops and laptops)

2. Overall Description

2.1 Product Perspective

The software in question was commissioned by the client in order to reduce developmental costs and increase efficiency when verifying and validating their product. The need for the software system was recommended by a consultant for the company. The system is a replacement for an old process; the client originally had manually analyzed and reviewed data logs. This process was prone to errors and cost the company more than necessary. Thus, this software is a brand new product meant to improve the process of producing test data.

2.2 Product Functions

The major functions that the product must perform are primarily as follows: handle data through standardizing, sorting, filtering, adding, and searching mechanisms; batch processing test cases; and an interactive user interface environment.

2.3 User Classes and Characteristics

There is only one level of user who shall interact with the system - primary users. The primary users shall be development and software engineers, which are first class users. They shall have the most education and experience relevant to the software. The users shall have full access to all of the operations of the program. The customer's domain experts are also primary users who shall also have full access to the program.

2.4 Operating Environment

The software shall operate in-house for a safety-critical system manufacturer. The hardware shall be primarily average corporate standard workstations (desktops and laptops), however, the software must work with the testing platform used by the client. The operating system shall be Windows 8 or later. The software shall not interact with other applications on the corporate system, however the software shall store and output various data logs and text files in its allocated space.

2.5 Design and Implementation Constraints

The developers shall be limited by several factors during the development of this software. The corporate and industry standards of the client's environment shall impact what the developers can and cannot do. The developers shall be limited by the amount of time allotted to the project. Programming standards and the IEEE Software Engineering Standards shall restrict the design and development. The software must be designed in such a way that it is secure, though since the program shall only be accessible to trusted corporate employees, this is less of a restriction. The program shall be restricted by language requirements and by the skill of its developers. The customer's organization shall be responsible for maintaining the delivered software, thus, it needs to be well documented and organized.

2.6 User Documentation

The user documentation shall consist of a simple “Read-Me” file, which provides basic, high level instructions on how to use the software. There shall also be a ‘help function’, where users can click a button that leads them to the “Read-Me” file.

2.7 Assumptions and Dependencies

The only assumed factors that could affect the requirements stated within this document are restrictions placed on the software from the industry standards of which the client operates, and the possible changes the client may want to make to the software. There shall be no re-used software; the product shall be made from scratch. We are assuming that this software shall be a web-based application.

3. External Interface Requirements

3.1 User Interfaces

1. The system shall display a scrollable list of all standardized log files
 - 1.1. The files shall be displayed by their file name
 - 1.2. Each displayed name shall be a button that when clicked opens and displays the plain text view of the log file
2. The system shall have an upload button.
 - 2.1. When this button is Left clicked it shall prompt the user to select a file using TBD 3121-1 method
 - 2.2. Once a file is selected TBD 3121-1 shall disappear and a progress bar saying “time left of standardization shall appear”
 - 2.3. If an error occurs before the file is standardized and added to the scrollable list, a popup window shall appear saying “an error has occurred while standardizing the file please try a different file”
 - 2.3.0. The pop up window has one button saying “understood”
 - 2.3.1. Once the button in the popup window is clicked the popup window and progress bar shall disappear
 - 2.4. While the progress bar is open the upload button shall be disabled
3. The system shall display a text input bar as well as a “Filter” dropdown menu which allows for filtering and sorting the results. These are located at the top of the scrollable list.
 - 3.1. The search bar input shall display the text “search”, while the sort and filtering dropdown shall display “filters” on the button, then display “filter by” and “sort by” in the menu itself, showing results such as “sort by date” and “filter by file type”
 - 3.1.0. When a word is entered into the text input bars it shall call method TBD 31310-1 and update the scrollable list accordingly
4. The system shall not have an action delay longer than 10ms whenever a button is pressed
5. Upon a right click from the user a help button shall be displayed

- 5.1. When the help button is clicked, all possible actions available on the current page shall be presented in a plain text view. The system shall know what to display by TBD 3151-1 method

3.2 Hardware Interfaces

1. The system shall be able to run on Intel(R) Core(TM) i7-8550U CPU @ 1.80GHz - 2.00 GHz
2. The system shall not take up more than 1GB of disc memory on a user's device
3. The system shall not take up more than 512MB of RAM on a user's device
4. The system shall only store, plain text files on the server and the user's device
5. When the system stores data logs, the system shall store the data logs in a standardized form on the server and the user's device

3.3 Software Interfaces

1. The system shall support operation on Windows OS 8 - 11
2. The system shall use TBD 332 as the programming languages for its operations
3. The system shall use TBD 333 libraries for its operations
4. The system shall use SQL for its database organization
5. The system shall only share standardized data and error messages between connected systems

3.4 Communications Interfaces

1. The system shall be HTTPS compliant
2. The system shall be CORS compliant
3. The system shall communicate between the user and TBD(343-1) with no more than 10ms delay
4. The system shall be compatible with Google Chrome
5. The system shall refresh its webpage every 10 milliseconds

4. System Features

4.1 Standardize Data

4.1.1 Description and Priority

The system shall take in a piece of data of format (TBD 411-1) and convert it into a predetermined standardized format (TBD 411-2). This is of **high** priority, as the system is meant to process and analyze data, thus, it must be displayed consistently.

4.1.2 Stimulus/Response Sequences

Stimulus

- Output of section - Add New Data Sources / Items

Response

- Once the output of the standardization function a copy should be saved to the server and user's device
- Update the data log list with the new data

4.1.3 Functional Requirements

REQ-1-1: If the data is in an acceptable format (TBD 411-1), then the system shall convert the data into (TBD 411-2) format.

REQ-1-2: If the data is not in an acceptable format (TBD 411-1), then the system shall output the error message "Invalid Data Source."

REQ-1-3: Input the standardized data into the system and offer it for export.

REQ-1-4: The system shall tell the user when there is no space left on the local host for the file to be.

4.2 Search Data

4.2.1 Description and Priority

The system shall search through the data in a specific way provided by the user. This is of **high** priority.

4.2.2 Stimulus/Response Sequences

Stimulus

- The user inputs a keyword into the searching bar. These keywords are pre-programmed to be associated with specific sorting characteristics. The user shall use a checkbox to determine if the system shall include 'NULL' and N/A values
- The user inputs a keyword into the searching bar. These keywords are pre-programmed to be associated with specific sorting characteristics. (use dropdown menu)

Response

- If the input is valid, the displayed data consists of data relevant to the users' input
- If the input is invalid, the displayed data shall not change and the sorting bar shall turn red, indicating that an error has occurred

4.2.3 Functional Requirements

REQ-2-1: The system shall have a sorting algorithm with a (TBD 423-1) implementation.

REQ-2-2: The system shall implement a sorting algorithm within that (TBD 423-1) format based on attributes.

REQ-2-3: The system shall display the most relevant results (within a 10 percent of similarity) to the input provided by the user in the command line of the program.

REQ-2-4: The system shall be able to distinguish between valid keywords and invalid keywords. A valid keyword shall have the system to search through the data accordingly and display the most relevant results. An invalid keyword shall raise an error and print to the user "Invalid Search Keyword".

REQ-2-5: The system shall be able to handle data points such as 'NULL' or 'N/A' while searching. The system shall also be able to handle unexpected values during the search for data.. The user shall be able to choose to include or disregard 'NULL' and N/A values.

REQ-2-5: The system shall not throw errors for unexpected values or 'NULL' or 'N/A' values present in the data set; the system shall associate these values with the corresponding category or context they are present in, and shall sort them at the bottom of each log-file.

4.3 Sort Data

4.3.1 Description and Priority

The system shall sort the data within the system in any specific order or combination provided by the user, within the confines of basic sorting algorithms and prompts. This requirement is of **medium** priority.

4.3.2 Stimulus/Response Sequences

Stimulus

- The user inputs a predefined keyword into the sorting bar. Each keyword is associated with a specific sort function or algorithm

Response

- If the input is valid, the displayed data consists of data relevant to the users' input
- If the input is invalid, the displayed data shall not change and the sorting bar shall turn red, indicating that an error has occurred.

4.3.3 Functional Requirements

REQ-3-1: The system shall have predefined keywords so that when a user inputs a keyword into the command prompt, the program sorts the data according to the predefined sorting mechanism associated with the keyword.

REQ-3-2: The system shall not throw errors for unexpected values or 'NULL' or 'N/A' values present in the data set; the system shall associate these values with the corresponding category or context they are present in, and shall sort them at the bottom of each log-file.

4.4 Filter Data

4.4.1 Description and Priority

The system shall be able to filter through all the data displayed by the system to the user through a keyword search, where the keywords are identical to categories or inputs of data. This requirement is of **medium** priority.

4.4.2 Stimulus/Response Sequences

Stimulus

- The user inputs a keyword into the filter bar. The keyword is identical to a data value or category that is present in the data displayed by the system

Response

- If the input is valid, the displayed data is now filtered by the users' input and highlights the data values associated with the filter
- If the input is invalid, the displayed data shall not change and the sorting bar shall turn red, indicating that the filter entered does not exist for the current data

4.4.3 Functional Requirements

REQ-4-1: The system shall be able to implement a tagging system

REQ-4-2: The system shall show or hide data which contains certain tags. When a filter is provided by the user, the system shall show the data that is associated with the filter through a 'tag', which highlights the data in yellow.

REQ-4-3: The system shall be able to tell if a filter keyword is valid or not - the filters must be predetermined in the software, or the filter keyword must match an explicit data value or category.

REQ-4-4: The system shall only filter for 'NULL' or 'N/A' values if the user is entering the keywords associated with only 'NULL' or 'N/A' values. The system shall also highlight any unexpected values in blue when filtering, to indicate a data value that the system does not know how to process.

4.5 Adding New Data Sources / Data Items

4.5.1 Description and Priority

The system shall have the ability to add new data sources and data items to the current data set. This is a **high** priority as allowing users to manipulate the data and the categories ensures that the system shall help the customer for many years to come.

4.5.2 Stimulus/Response Sequences

Stimulus

- An uploaded file from the user of the form (TBD 411-1)
- The program shall confirm that the server is connected to the system

Response

- If the server is not connected to the system, the system does not allow items to be saved to the server and shall tell the user something along the lines of "using a pop up the the file was only added locally and shall not appear next session"
- If the user inputs valid data, the system shall output the data in a standardized format
- If the user inputs invalid data, the system shall output an error message "Invalid Data Source"

4.5.3 Functional Requirements

REQ-5-1: The system shall be able to communicate with the server.

REQ-5-2: The system shall have permissions to save data locally on the user's computer and shall have permissions to save data with the company's server.

REQ-5-3: The system shall update the data log's list with the new data once the data is completely generated and saved to either the local computer or the company's server.

4.6 Individual Interactive Analysis

4.6.1 Description and Priority

The system shall be able to show the data logs in an interactive format to the user and allow the user to investigate the data. This is the normal operation of the UI for the system. This functionality is of **high** priority.

4.6.2 Stimulus/Response Sequences

Stimulus:

- The full set of standardized data
- The user actions on the UI

Response:

- Interactable interface appears and updates according to user actions

4.6.3 Functional Requirements

REQ-9-1: The system shall display the sort, filter, and search input sections, depending on the user's input.

REQ-9-2: The system shall display the current and relevant data log list.

REQ-9-3: The system shall contain a Help User Function, described in the section 4.10.

REQ-9-4: The system shall have a functional UI that is up to the standards set by this document.

4.7 Save Settings

4.7.1 Description and Priority

The feature allows the user to save the sort/search/filter settings. This shall allow the user to use the same settings multiple times or part of an automated analysis. This is a **medium** priority.

4.7.2 Stimulus/Response Sequences

Stimulus

- A left click on the save settings button

Response

- The system shall create a file that saves the filter, search, and sort criteria in the format (TBD 472-1)
- If the system is unable to create the file, an error message shall appear as follows:
 - If the computer lacks space to save file, the error message shall be: “File Not created: Not enough space”
 - If the system lacks the permissions to create a file, the error message shall be: “File Not Created: System lacks permissions”
 - If the filter, search, and sort settings are invalid, the error message shall be: “File Not Created: Invalid Settings”
 - If other errors occur, the error message shall be: “File Not Created: There was an error”

4.7.3 Functional Requirements

REQ-7-1: The system shall be able to test if the settings are valid. If a setting is not valid, return error (TBD 473-1)

REQ-7-2: The system shall be able to create a file in a valid format for the Load Settings and Batch Processing functions.

4.8 Load Settings

4.8.1 Description and Priority

The system shall have the ability to load the previously saved search, sort, and filter settings. This is a **medium** priority as it shall allow the user to use the same settings from a previous session.

4.8.2 Stimulus/Response Sequences

Stimulus

- A left click on the load settings button
- A file of type (TBD 472-1)

Response

- The system shall load a file that sets the filter, search, and sort settings in the current analysis
- If the system is unable to load the file, an error message shall appear
 - If the file does not have valid settings for all settings, it shall try to set all values it can and then give the error message: “File Loaded Incorrectly: Not All Settings Valid”
 - If the file is of invalid format, the error message shall be: “File Not Loaded: Invalid Format” If the system lacks the permissions to load a file, the error message shall be: “File Not Loaded: System lacks permissions”

- If other errors occur, the error message shall be: “File Not Loaded: There was an error“

4.8.3 Functional Requirements

REQ-6-1: The system shall have permissions to load a file stored locally on the computer.

REQ-6-2: The system shall be able to read a file in the correct format, and then set the search, sort, and filter settings.

4.9 Batch Processing

4.9.1 Description and Priority

The system shall take in the known test cases and apply them to the selected data logs. This is of **medium** priority.

4.9.2 Stimulus/Response Sequences

Stimulus

- A set of test cases
- The data logs to process
- Click “Select” button, select files from file manager, click “Process” button

Response

- The results of the test cases on the data logs contained in a text file
- The results of the test cases on the data logs shall be displayed

4.9.3 Functional Requirements

REQ-8-1: The user shall be able to add and remove test cases from the system

REQ-8-2: The system shall display the results of the test cases by (TBD 493-1)

REQ-8-2: Should an error occur during the processing, the system shall display an error message to the user: “Batch processing failed to execute properly”.

4.10 Help User Function

4.10.1 Description and Priority

The system shall contain a help function such that users can consult a pre-written set of instructions on how to use the system. This requirement is of **low** priority.

4.10.2 Stimulus/Response Sequences

Stimulus

- Right-clicking the ‘help’ button near the search bar.

Response

- The system shall display all the current actions a user can take on a given screen and written instructions on how to use them.

4.10.3 Functional Requirements

REQ-10-1: The help function shall pull up the user documentation and display it on the screen.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

1. The system shall process input log files in under (TBD 51-1) seconds. In order for users to get a response from the system.
2. The system shall sort, filter, and search in under (TBD 51-2) seconds. This is to make the system responsive to user input. By keeping the system response under (TBD 51-1) the user shall be able to not be frustrated by apparent unresponsiveness.
3. The system shall be able to do other functions under (TBD 51-2) seconds. This is a reasonable time to expect other functions to finish.

5.2 Safety Requirements

1. The system shall only modify files it has created.
2. The system shall not create any file if there is no room to store them in its allocated space
3. The system shall save 1MB of space in the front and end of its allocated memory space to act as a buffer
4. All other safety requirements or concerns related to the system are handled by the customer.

5.3 Security Requirements

1. N/A. The customer is handling security on the system

5.4 Software Quality Attributes

1. The system shall be adaptable. It should easily be capable of using multiple data sources.
2. The system shall be flexible. These data sources shall be varied and thus the system shall be capable of dealing with the different sources
3. The system shall be robust. It should easily be capable of handling edge cases with the different sources.
4. The system shall be extendable. It should easily be extended to handle new data sources.

5.5 Business Rules

1. N/A. The customer is handling any business rules or regulations.

6. Other Requirements

TBD 6-1

Appendix A: Glossary

Not applicable for now

Appendix B: Analysis Models

Not applicable for now

Appendix C: Use Cases

Use Cases are a way of describing interactions between users and a system using a graphical model and structured text. Page 111 of the textbook

Actor(s): System Engineer

1. Search
 - a. Actor is able to search for specific data by its labeled name
2. Sort
 - a. Actor is able to sort data by specific data tags (e.g. date)
3. Filter
 - a. Actor is able to sort data by specific data tags (eg. file type)
4. Save
 - a. Actor is able to save their search/sort/filter settings
5. Batch processing
 - a. Actor is able to apply a variable number of test cases to selected standardized data logs
6. Upload/standardize data
 - a. Actor is able to upload data of type of TBD 411-1, and the system converts it into the type of TBD 411-2

Appendix D: To Be Determined List

How to read a TBD: The digits before the dash signify the section the TBD was first used in, e.g. TBD 3121-1 was first used in section 3.1.2.1 and TBD 411-1 was first used in Section 4.1.1

1. TBD 3121-1

2. TBD 31310-1
3. TBD 3151-1
4. TBD 343-1
5. TBD 411-1
6. TBD 411-2
7. TBD 423-1
8. TBD 472-1
9. TBD 473-1
10. TBD 493-1
11. TBD 51-1
12. TBD 51-2
13. TBD 6-1