Milestone 1 - Test Plan

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Introduction

The GE Wayside Mobile Application is a tool that GE is developing to assist railroad local maintainers in troubleshooting the Wayside Controller systems. A Wayside Controller consists of the Switch Control, Crossing Control, and Signal Control which all provide different functions for the railway in order to guide the train.

As a part of the project, we are tasked with figuring out how to communicate with the ElectroLogIXS System. The ElectroLogIXS system is used to control many features of the railway. Specifically, we are interested in the recording and diagnostics part of the system. The system logs various vital and non-vital events, as well as changes to the system configuration and error messages.

Please note that this document does not contain information on scenario testing, connection-protocol testing and unit testing, and it also does not contain information on expected behavior and proper input/output, due to non disclosure agreement.

Test Cases

1. **Connection to the ElectroLogIXS system**

   - Test wireless connection to the system.
   - Test connection range and maximum connection strength that could be achieved.
   - Test parallel connectivity to multiple systems that are in range.
   - Test the effect of weak/lost connection on application.
   - Test data transfer speed at various distances to ensure proper connectivity.
   - Test if the application properly detects all the systems that are in range.

2. **Storage capacity**

   - There might be thousands of log files that would get transferred to the mobile device daily. Hence, test if the application is capable of handling these files properly.
   - Test how low/no storage space on the device affect the behavior of the application.

3. **Event logging**

   - Test error logging of the application

- Test if the application correctly logs system (info) events.
- Test if the application correctly logs debugs events.
- Test if the application correctly logs warnings events.

4. Error code parsing

- Test if the application properly parses error codes that are retrieved from the ElectroLogIXS system.
- Test if the application reports an unrecognized error code in the system log.
- Test if the application properly parses different data and time stamps of the event.

5. Search feature

- Test if application is properly able to search/retrieve all the error from the local database.
- Test if the application provides an appropriate description of an error code.

6. Local database operations

- Test various operation on local database.
- Test if the application is able to update an existing entry
- Test if the application is able to create a new entry
- Test if the application is able to delete an existing entry
- Test if the application is able to query an existing entry

7. Master database operation
- Test if the application is able to establish ha proper connection to the master database.
- Test if the application is able to properly compare its local database with the master database to look for updates.
- Test if the application can identify new changes made to the master database.

8. Security

- Test overall application security.
- Test if connection between the device and the ElectroLogIXS system is secure.
- Test if the application connects to the master database securely.
- Test if the new updates sent to the application are secured.

9. **User interface**

- Test simplicity and intuitiveness of the user interface.
- Test if the user interface is easy for the maintenance workers to user.
- Test if the user interface follows the following 'perceptual principles' of display design.

   - ✓ Must be legible
   - ✓ Avoid judgement limits (don't include more than 5-7 levels of a single sensory variable like color, size, or loudness)
   - ✓ Top down processing (signals should coincide with expectations or past experience)
   - ✓ Redundancy gain (signals presented in alternative formats)
   - ✓ Discriminability - similarity causes confusion; make signals distinctive

- Test if the user interface follows the following 'mental model principles' of display design.

   - ✓ Principle of pictorial realism (should look like the variable it represents)
   - ✓ Principle of the moving part (should move in direction compatible with mental model)

- Test if the user interface follows the following 'principles based on attention' of display design.

   - ✓ Minimizing information access cost (keep displays small to minimize scanning to acquire info)
   - ✓ Proximity compatibility principle (deals more with mental distance; two or more sources of info are related to same task and must be mentally integrated; sometimes not always a good idea)
   - ✓ Principle of multiple resources (presenting visual and auditory info concurrently rather than all visually or auditorily)

- Test if the user interface follows the following 'memory principles' of display design.

   - ✓ Replace memory with visual information
   - ✓ Knowledge in the world (use menus/checklists)
   - ✓ Principle of predictive aiding (helps the operator offload the use of mental

resources; making predictions is a resource-demanding cognitive task)
- ✓ Principle of consistency (standardized displays)

10. Android application

- Test the life cycle of the android application
- Test system usage of the application
- Test the performance of the application under less powerful hardware.
- Test the multitasking ability of the application with other application.