UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

REQUIREMENTS AND DESIGN SPECIFICATION
Mobile Monitoring App
Emilio Mumba

The 5 Concurrent Nodes

Khathutshelo Shaun Matidza
Sylvester Sandile Mpangane
Thabang Michael Letageng
Matthew Nel

Department of Computer Science, University of Pretoria

Aug 2015

Contents

1 Vision and Scope

1.1 Project Vision

Digital forensics is defined as the use of scientifically derived and proven methods towards the preservation, collection, validation, identification, analysis, interpretation and presentation of digital evidence derived from digital sources for the sole purpose of facilitating or furthering the reconstruction of events found to be criminal or helping to anticipate the unauthorized actions shown to be disruptive to planned operations. Readiness is considered as the process of being prepared for a digital investigation before an incident has occurred.

The proposal of a mobile monitoring application will promote readiness in digital forensics and protect mobile users from malicious entities and activities. It aims to provide a proactive measure that is undertaken by the mobile device user or mobile device owner. Having this application installed on mobile devices will proactively ensure that relevant digital evidence is made ready and available before an incident occurs. The mobile monitoring application is expected to monitor user activities on a mobile device and report application data/logs to a dashboard on a desktop computer. It will generate reports giving the investigator quick and comprehensive data/logs that provide a starting point during a mobile device investigation.

The objective of the mobile monitoring application is to collect data/logs and assist in understanding the activities performed by a mobile user as well as shedding more light into the behaviour of the mobile user. Combining activities from the various applications promotes a proactive approach which in turn enforces proactive (readiness) measures.

1.2 Project Scope

The high level modules of the iCrawler monitoring app are as indicated in the figure below. Additionally, the responsibilities of each module are noted.
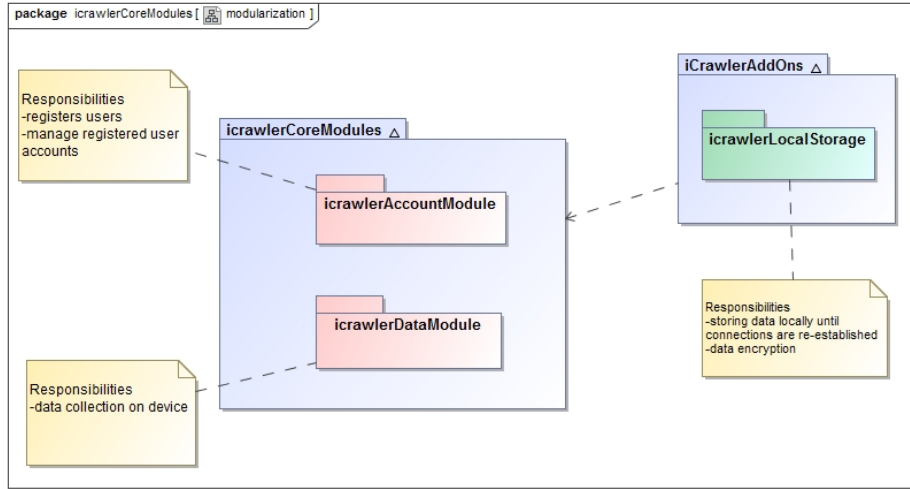

Figure 1: High Level App Modules

2 Application Requirements and Design

The following section will explain each module in the mobile monitoring app. The use-case design, functional requirements extracted from the use-case along with the selected service contracts will additionally be discussed.

2.1 Modular System

The application uses a modular design approach. This allows the following to be achieved:

- add new functionality in the future

- decouple the system

4

2.2   iCrawler - Account Module
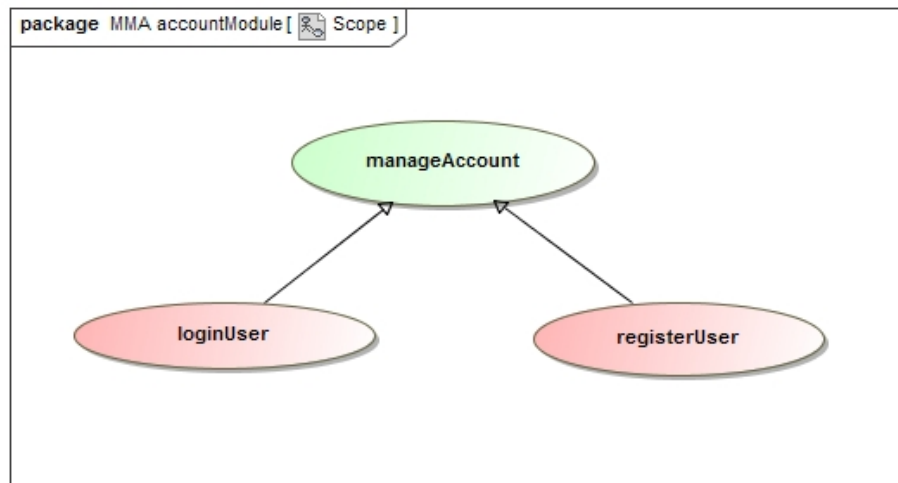
2.2.1   Scope

Figure 2: Scope - mmaAccounts module

2.2.2   Use-Cases

This section provides details on the use-case requirements for the use-cases offered by this module.

2.2.2.1   registerUser - priority: important   This use-case registers a user on initial installation after user accepts terms and conditions of use.

Service Contract: The service contract for registerUser is shown in the figure below. The pre-conditions are enforced (raises an exception if not met) and on success the user is registered and the device and user data is persisted to the database.
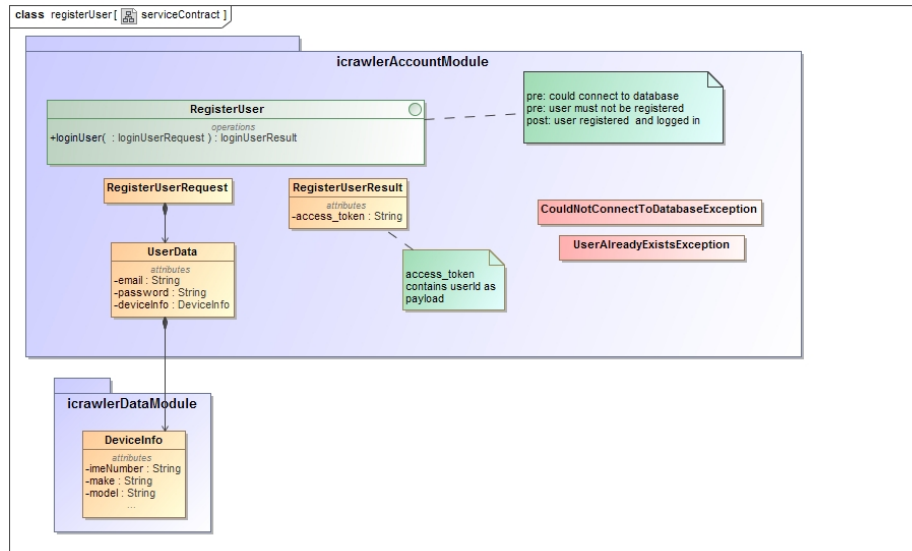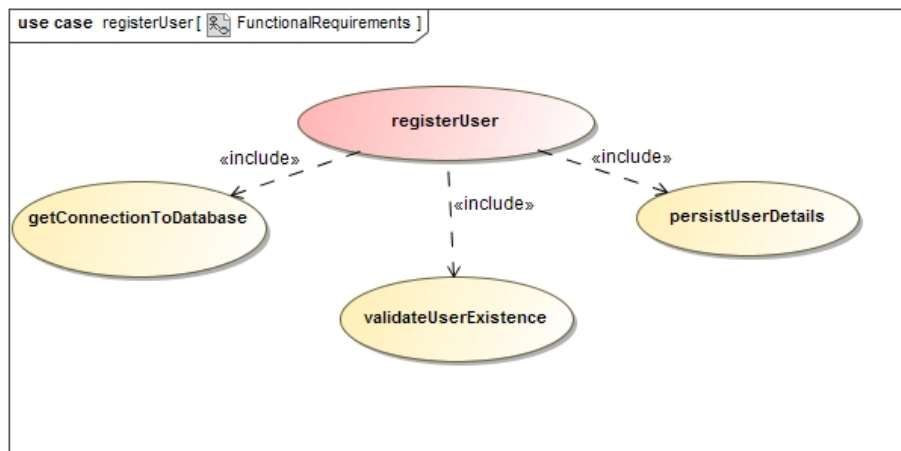

Figure 3: Service Contract - Register user

Figure 4: Functional Requirements - Register user

2.2.2.2 Process specification: When a request is made for a user to register, a connection to the database must be established. If no connection to the database can be made, then an exception is thrown. Alternatively, validateUserExistance is called to check if that user exists or not. If the user does exist then an exception is thrown, if not then that user is registered.
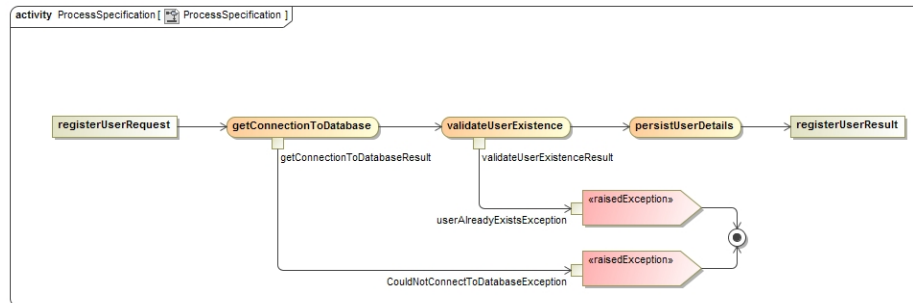

Figure 5: Process Specification - Register user

2.2.2.3 loginUser - priority: important This use-case logs in a user on initial installation after user accepts terms and conditions of use.

Service Contract: The service contract for loginUser is shown in the figure below. The pre-conditions that are enforced(raises an exception if not met) and on success the user is logged in and the device, including user data are persisted to the database.
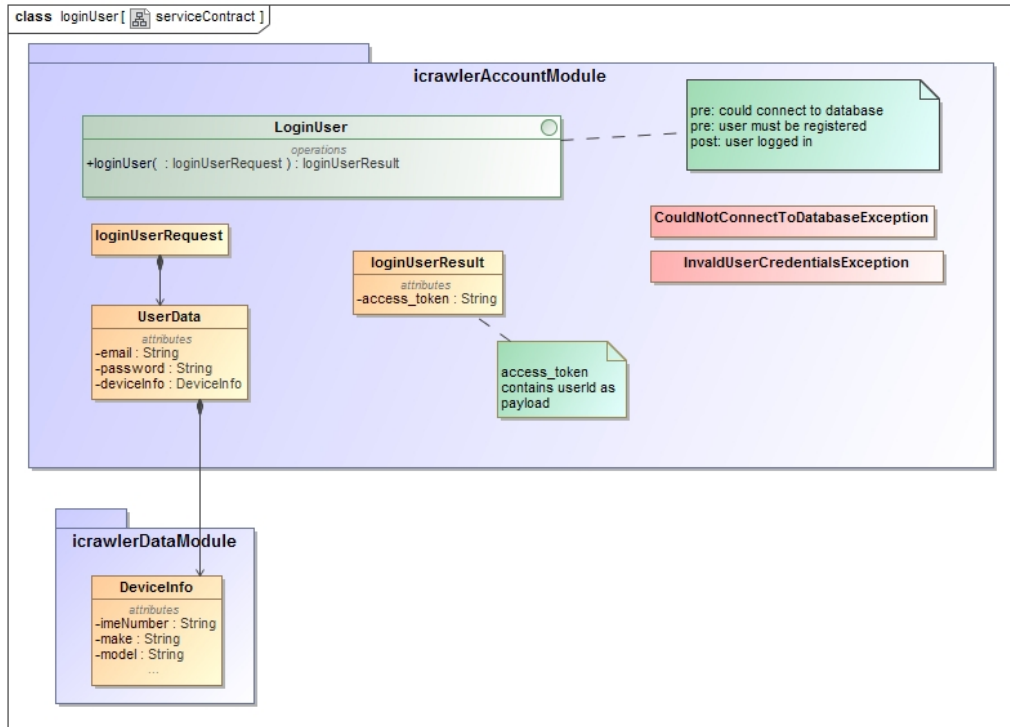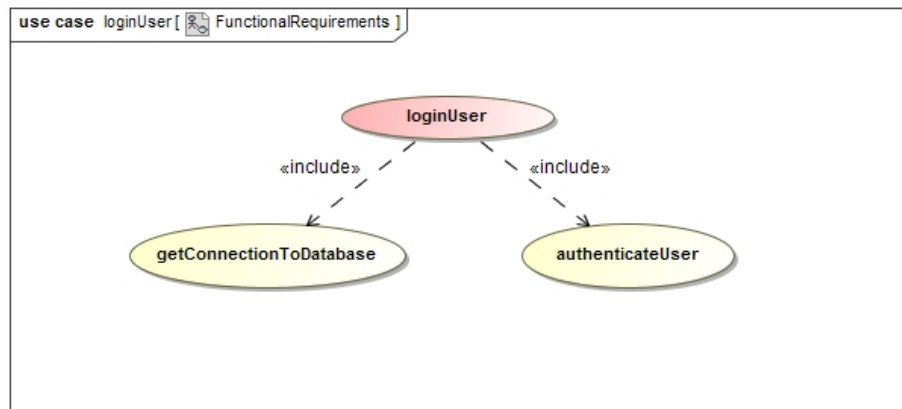
Figure 6: Service Contract - Login user

Figure 7: Functional Requirements - Login user

8

2.2.2.4 Process specification: When a request is made for a user to login a connection to the database must be established. If no connection to the database can be made then an exception is thrown. If a connection to the database is established, a login request is made, if user credentials are valid the user is logged in otherwise an exception is thrown.
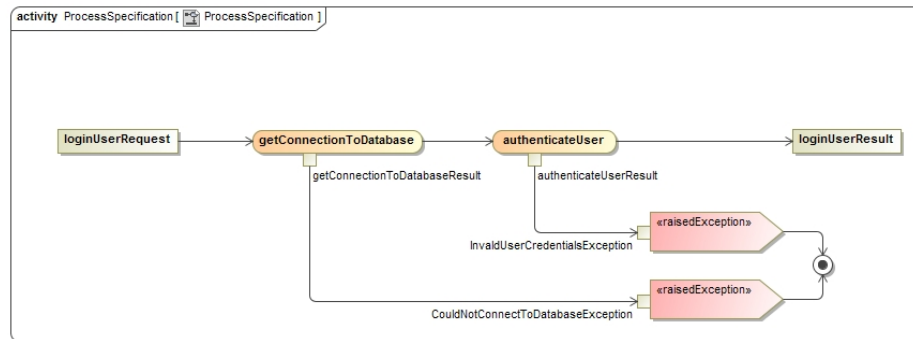

Figure 8: Process Specification - Login user
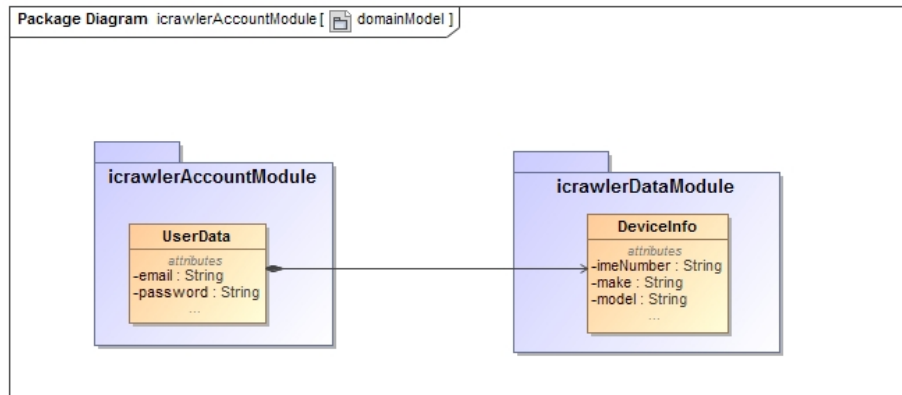
2.2.3 Domain Model

The domain model for iCrawlerAccountModule.

Figure 9: Domain Model - Account Module

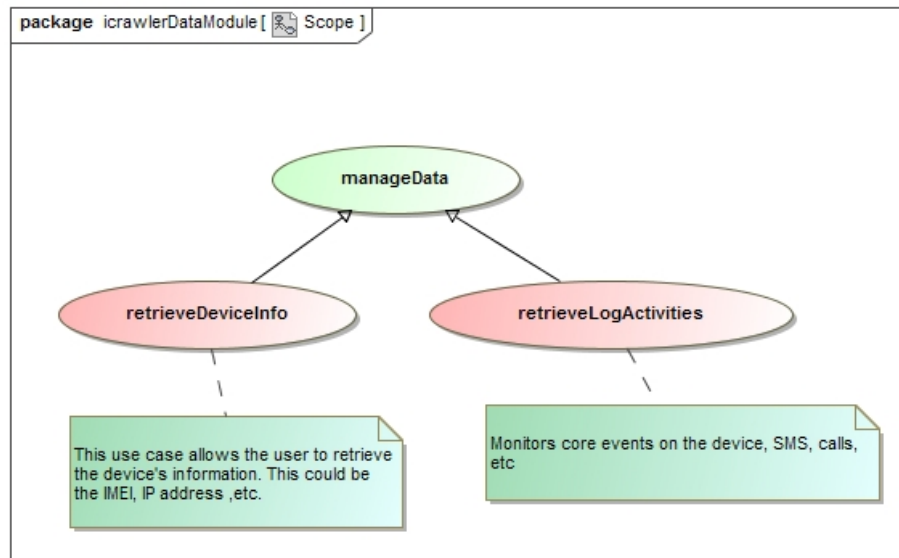## 2.3 MobileMonitoringApp - Data module

2.3.1 Scope

Figure 10: Scope - dataModule

2.3.2 Use-Cases

This section provides details on the use-case requirements for the use-cases offered by this module.

2.3.2.1 retrieveDeviceInfo - priority: important The retrieveDeviceInfo use case retrieves all the relevant device information from the device.

Service Contract: The service contract for retrieveDeviceInfo is shown in the figure below. The retrieveDeviceInfo receives a retrieveDeviceInfoRequest object that specifies the type of data to be retrieved and stored locally on to a database.
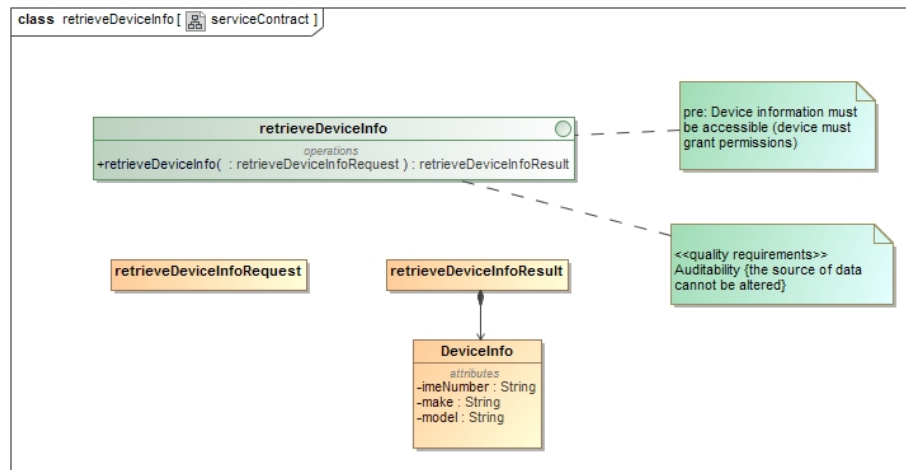
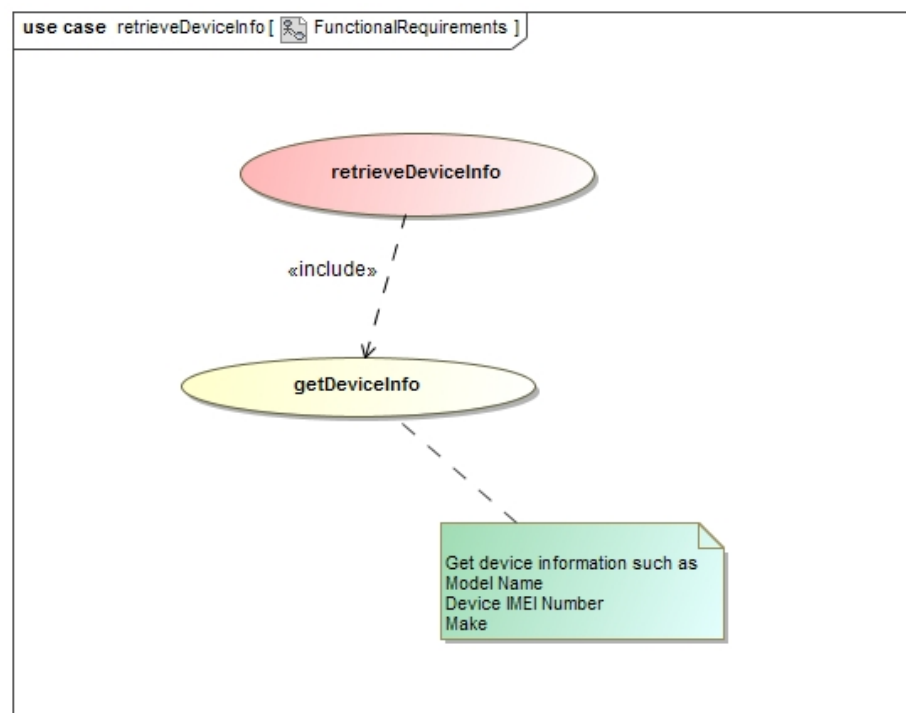Figure 11: Service Contract - retrieveDeviceInfo

Figure 12: Functional Requirements - retrieveDeviceInfo

2.3.2.2 Process specification: This activity diagram depicts the process specification for retrieving device information which includes IMEI number, device make and model
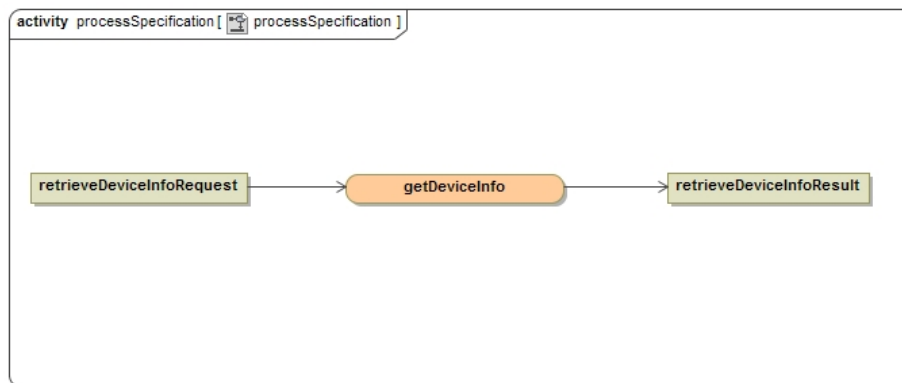

Figure 13: Process Specification - retrieveDeviceInfo

2.3.2.3 retrieveLogActivities - priority: important The retrieveLogAcitivites use-case retrieves all the users activity logs from the various apps on the device.

Service Contract: The service contract for retrieveLogAcitivites is shown in the figure below. The retrieveLogActivitiesRequest requests the data from the device's content provider and tries to send the data to the server.
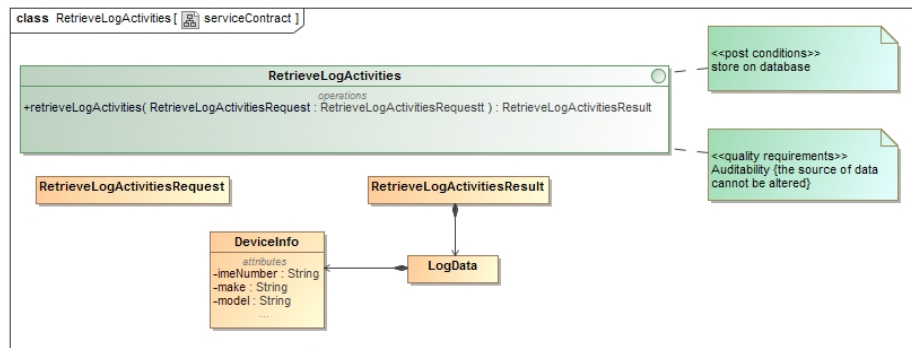

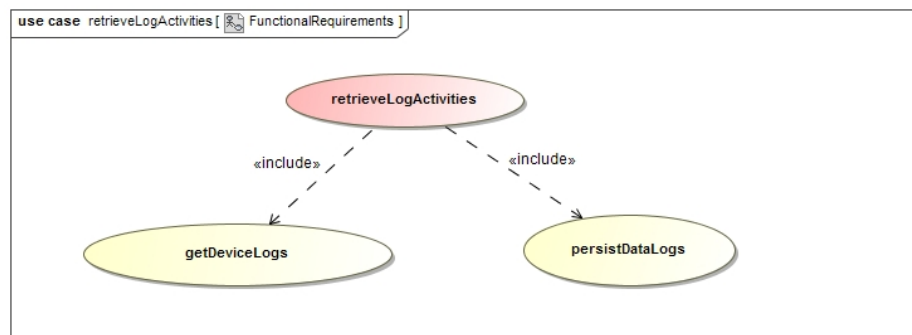Figure 14: Service Contract - retrieveCommunicationAcitivites

Figure 15: Functional Requirements - Retrieve Communication Acitivites

2.3.2.4   Process specification: The service receives a request that specifies the type of activity it needs to collect data from. The service will then try to retrieve the data from that activity. Upon retrieving the device logs, the service tries to persist the data logs to the database.
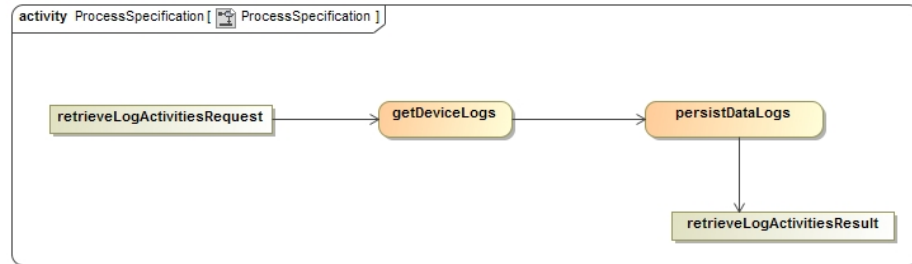

Figure 16: Process Specification - Retrieve Communication Acitivites

2.3.3 Domain Model

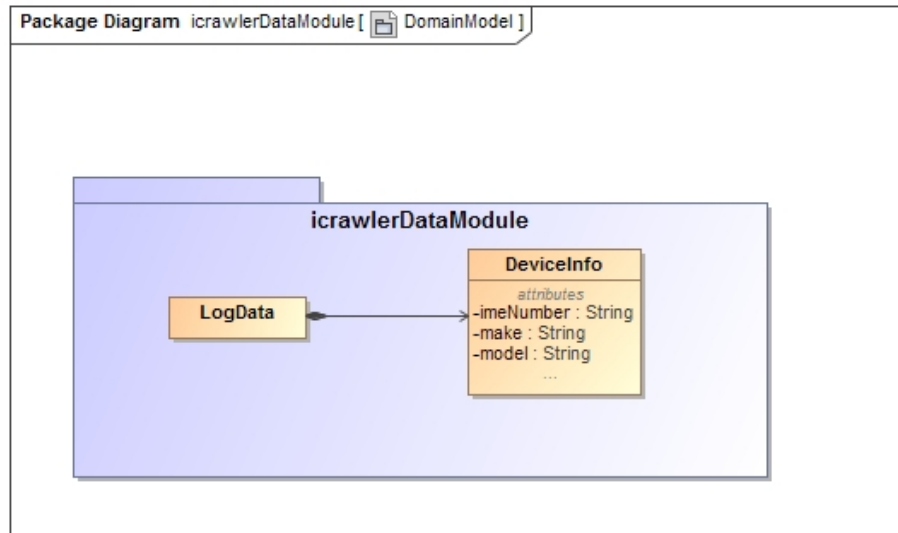The diagram below depicts the domain model for the DataModule .

Figure 17: Domain Model - Data Module

2.4 MobileMonitoringApp - Reports module
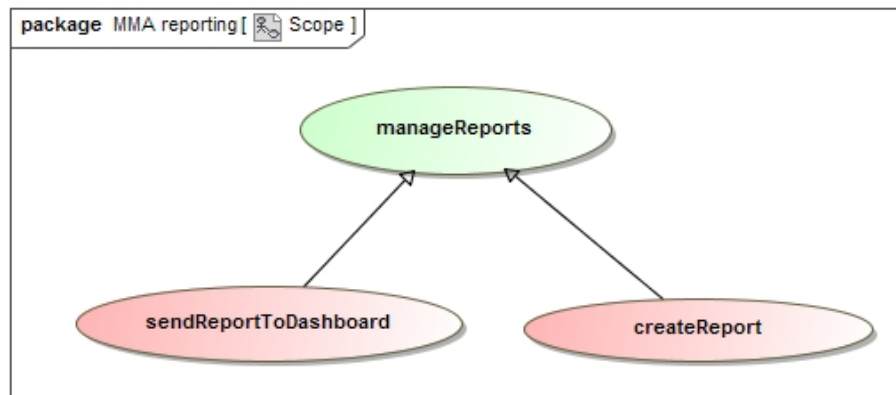
2.4.1 Scope

Figure 18: Scope - Reporting Module

2.4.2 Use-Cases

This section provides details on the use-case requirements for the use-cases offered by this module.

2.4.2.1 createReport - priority: important This use-case retrieves logs from the device's local database and creates a report from those specific logs.

Service Contract: The service create report is shown in the figure below. The pre-condition is enforced.
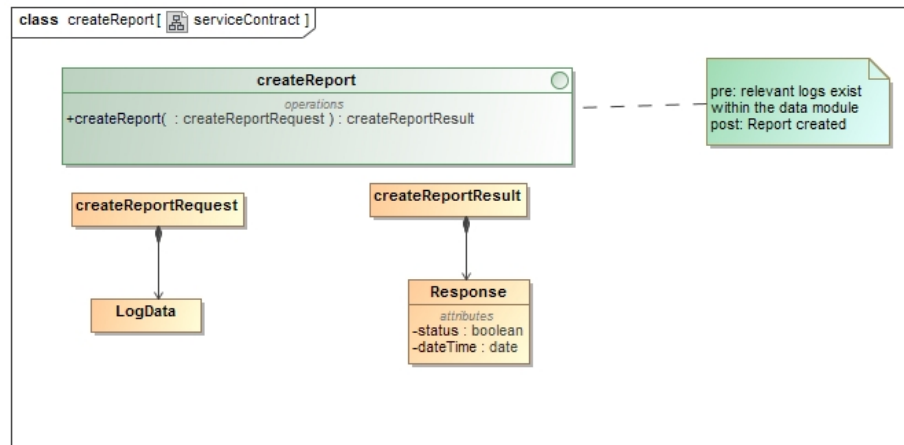

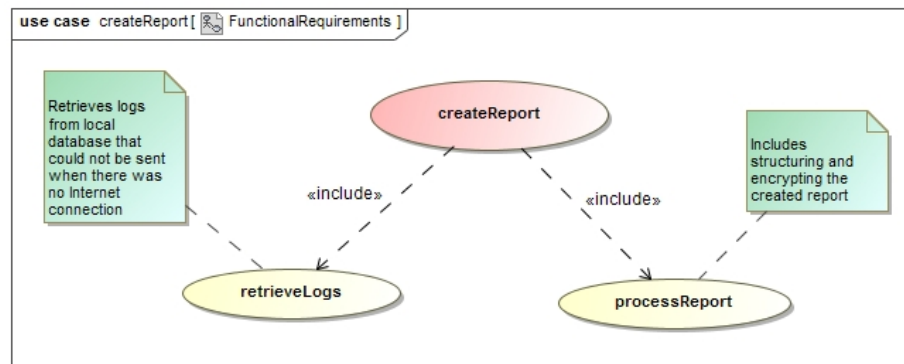Figure 19: Service Contract - Create Report

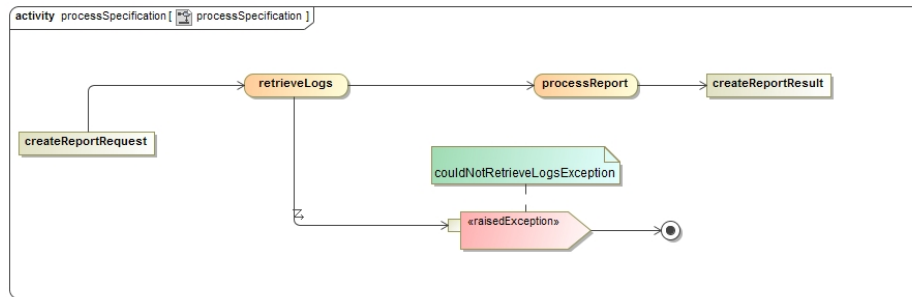Figure 20: Functional Requirements - Create Report

Figure 21: Process Specification - Create Report

2.4.2.2 sendReportToDashboard - priority: important   This module sends the report onto a server where it will be saved on a database to be displayed later on a dashboard .

Service Contract: The service contract for sendReportToDashboard is shown in the figure below. The pre-condition is not enforced i.e. If the app fails to establish a connection with the server, the report will be saved temporarily on the device's local database until a connection is established.
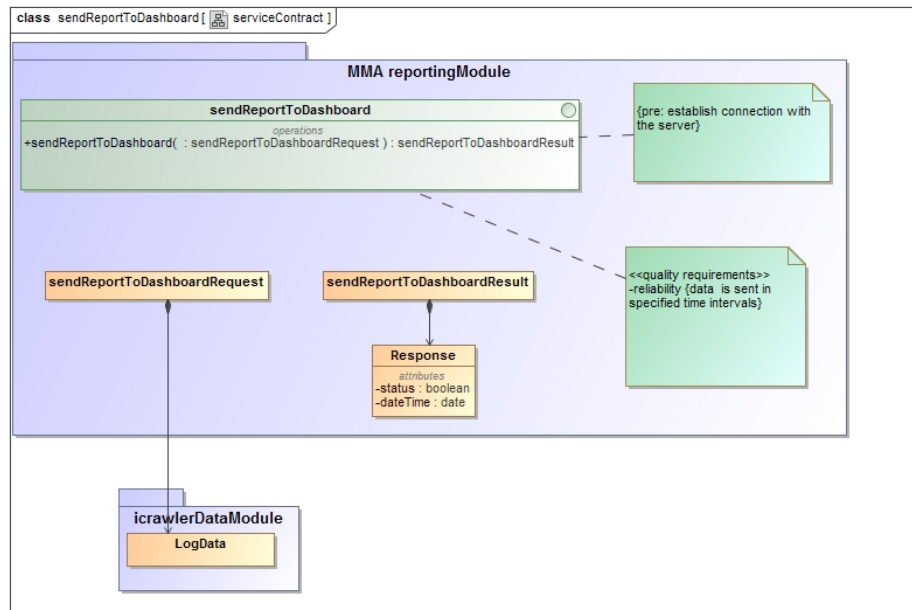
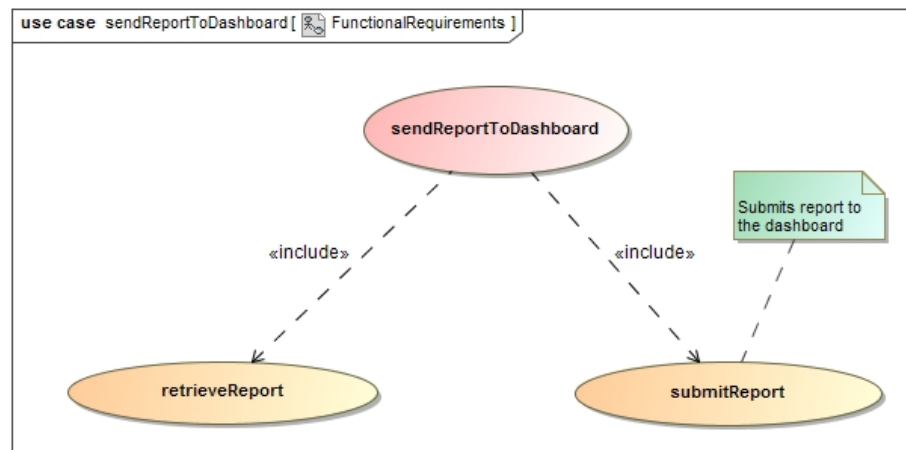Figure 22: Service Contract - Send Report To Dashboard
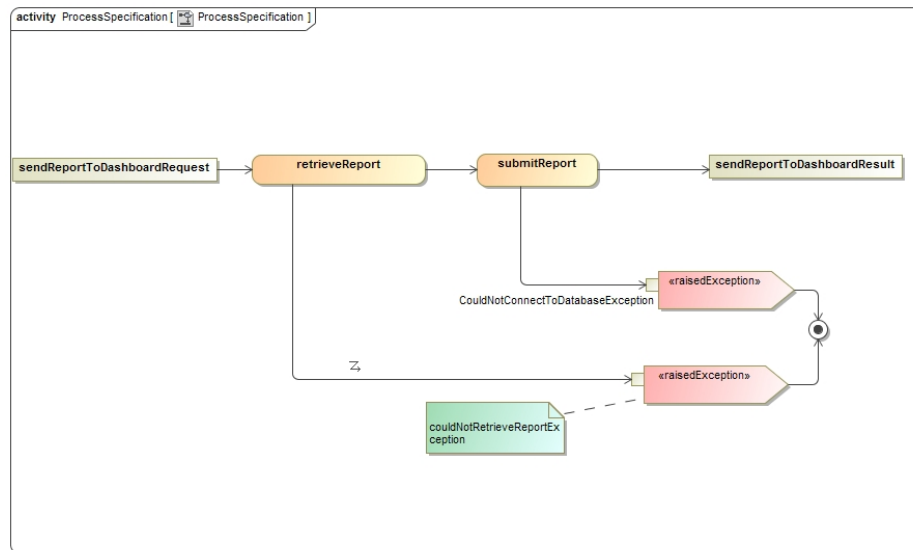

Figure 23: Functional Requirements - Send Report To Dashboard

Figure 24: Process Specification - Send Report To Dashboard