TCP Solutions

COS 301 FINAL YEAR PROJECT 2014

We are a team of open-minded individuals with strong technical skills, as well as excellent interpersonal skills. We are eager to be challenged in order to grow and improve our communication and professional IT skills gained through previous experiences in the IT field.

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Contents

[i Executive Summary 1](#_Toc400119758)

[ii Title Page 2](#_Toc400119759)

[1 Overview 3](#_Toc400119760)

[2 Vision and Scope 4](#_Toc400119761)

[2.1 Scope and limitations 5](#_Toc400119762)

[3 Architecture requirements 6](#_Toc400119763)

[3.1 Access channel requirements 6](#_Toc400119764)

[3.2 Quality requirements 6](#_Toc400119765)

[Security 6](#_Toc400119766)

[Auditability 7](#_Toc400119767)

[Scalability 7](#_Toc400119768)

[Performance 7](#_Toc400119769)

[Reliability 8](#_Toc400119770)

[Usability 8](#_Toc400119771)

[Maintainability 8](#_Toc400119772)

[3.3 Integration requirements 8](#_Toc400119773)

[3.4 Architecture constraints 8](#_Toc400119774)

[4 Software Architecture Documentation 9](#_Toc400119775)

[4.1 Architecture requirements 9](#_Toc400119776)

[4.1.1 Architectural scope 9](#_Toc400119777)

[4.1.2 Quality requirements 9](#_Toc400119778)

[4.1.3 Integration and Access channel 10](#_Toc400119779)

[4.1.4 Architectural constraints 10](#_Toc400119780)

[4.2 Architectural Pattern 11](#_Toc400119781)

[4.3 Architectural tactics or strategies 12](#_Toc400119782)

[4.4 Use of reference architectures and frameworks 12](#_Toc400119783)

[4.4.1 Presentation Layer 13](#_Toc400119784)

[4.4.2 Service Layer 13](#_Toc400119785)

[4.4.3 Domain Layer 13](#_Toc400119786)

[4.4.4 Infrastructure Layer 13](#_Toc400119787)

[5 Functional requirements and application design 14](#_Toc400119788)

[6 Glossary 26](#_Toc400119789)

# i Executive Summary

This document is to detail a proposal for the Forensic Medicine Mobile Application project that provides a platform for Forensic Officers (FO) and Forensic Medical Practitioners (FP) to record and access information gathered in their investigations. This document also looks at the problems with the current system and addresses how the problems will be solved.

# ii Title Page

**Vision and Scope, Architectural Requirements Specification, Architecture Specification document**

**Project name:** Forensic Medicine Mobile Application

**Client name:** Cornelia E

**Group name:** TCP Solutions

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**GIT Repository:** https://github.com/CollenMphabantshi/TCP-Solutions

**Final Version Change History**

|  |  |  |
| --- | --- | --- |
| Name | Date | Changes |
| TCP Solutions | 14 May 2014 | Vision and Scope |
| TCP Solutions | 15 May 2014 | Addition to vision and Scope and quality requirements. |
| TCP Solutions | 16 May 2014 | Software Architecture |
| TCP Solutions | 23 May 2014 | Final document |

# 1 Overview

This document provides the overall vision and scope of the Forensic Medicine Mobile Application project. It explains and illustrates what the system will do and look like. This document basically provides the skeleton of our project. It includes the scope limitations and exclusions which will help guide the stakeholders on what is expected and not expected. This document also include use case diagram which will help explain and show the whole system.

# 2 Vision and Scope

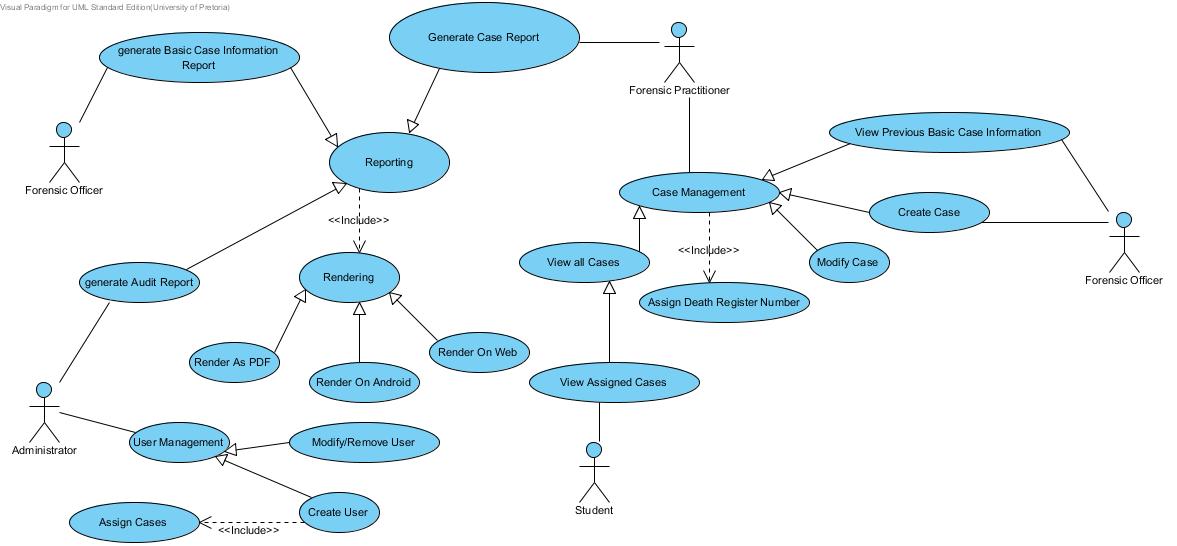


Figure 1: The Scope of the system

The proposed system is the death scene register that allow:

Forensic officers to

* Capture data from death scene – the FO’s will gather information on every scene based on the template it has on the mobile application
* View basic information – the FO’s views personal details of the deceased and police officer who was at the scene

Forensic practitioner to

* Generate reports – FP’s will generate Web, Android and PDF reports specifically to their needs e.g. generate report of all hanging cases 2014
* View all cases – every scene stored on the database they should be able to view them
* Edit case information - if there was any errors made on the form such as spelling errors FPs should be able to correct them
* Manage cases – FPs will dictate if the case is natural and non-natural death and do other functionalities.

Students to

* View all the cases cleared to them – this is for research purpose only

Administrator to

* Add new users.
* Remove users.
* Edit users – change personal details and access rights.
* View audit report.

## 2.1 Scope and limitations

Pictures that demonstrate how the incident happed are excluded on this phase, maybe they can be added at a later stage.

# 3 Architecture requirements

## 3.1 Access channel requirements

- It is going to be accessed by humans using android and web application. The application will communicate with a cloud-server-system that provides a DBMS and a platform that allows information to be display to the users. We have so far been using AfriHost Web Services as a platform for the above mentioned requirements. AfriHost offers a platform with all the necessary tools for us to specify the type of connection or service needed and to provide us with an infrastructure to manage these services.

## 3.2 Quality requirements

### Security

- Authentication

\* The users have to have an account in order access the application; this will provide the users with a username and password. These associated pieces of information are important as they will be required for the authentication process i.e. logging. – A user will have to provide his or her username as well as their associated password in order for them to be logged in and for a session to be created for them

- Integrity

∗ Information captured will be encrypted before sent to the database.

∗ The images that are captured on the device, should be checked if they were altered before they are uploaded to the server.

- Authorization

Tokens (Access Controls) will be assigned to each user, irrespective of the sort of account that they may hold. The tokens determine the user’s privileges, they also determine what the user is allowed to read e.g view all the cases or just specific ones.

∗

|  |  |
| --- | --- |
| Tokens | Privileges |
| 1 | Administrator |
| 2 | Forensic practitioner |
| 3 | Forensic officer |
| 4 | Students |
| n | Guests |

- System users will have different permission.

- Information stored by forensic officers will not be edited after the submission.

### Auditability

- The system should record all the changes made to the data stored, by showing whom, when and what was changed.

- It will also show old and new values.

### Scalability

- The web hosting server supports 500GB traffic.

- It should allow additional templates.

### Performance

- The system should process all the reports within 10 seconds.

- It should send the information to the server within seconds.

### Reliability

- The system should be up and running all the time.

- Easy and fast access to the database.

### Usability

- Users should be able to use the system without prior training.

- The system will be in English.

### Maintainability

- The system will be maintained every time the client needs new changes.

## 3.3 Integration requirements

- Database will be created from scratch.

- The android application will be connected to the web service and the web service connected to the server.

## 3.4 Architecture constraints

- Mobile client must be running on an android application.

- The technologies that we will use is Asus nexus 7

* Android SDK
* MySQL
* HTML5,PHP,apache(Afrihost)
* Java
* Ajax, jQuery, SOAP

# 4 Software Architecture Documentation

## 4.1 Architecture requirements

### 4.1.1 Architectural scope

The database will run on Afrihost.

**Android app** - The android application will be used to capture information on death scenes. Also used to view information based on clearance.

**Web app** - will be used for data management, report generation, and system administration.

**Web service** – php web service will be connecting the android and web application with the back database.

**MySql database** – it will store all data captured by android app and web app interactions.

### 4.1.2 Quality requirements

* **Security** - Only authorized people should be able to have access to the system. Only administrator should register people.
* **Auditability** - Any change made to data stored should be recorded. The system should record what, who and when changes were made.
* **Performance** - Data should be sent in real time e.g. from forensic officer to forensic practitioner should receive it within 10 seconds.
* **Reliability** - The server should run all the time (24 hours a day) and the connection should always be active.
* **Usability** - All the users should be able to use the system without any prior training.

.

### 4.1.3 Integration and Access channel

Access Channel

* Accessible by humans through the following channels
  + Admin – the access it through web application.
  + FO, FP and students – they show access the system through mobile application on android tablet device.

Integration Channel

* The new SQL database will be created in Afrihost.

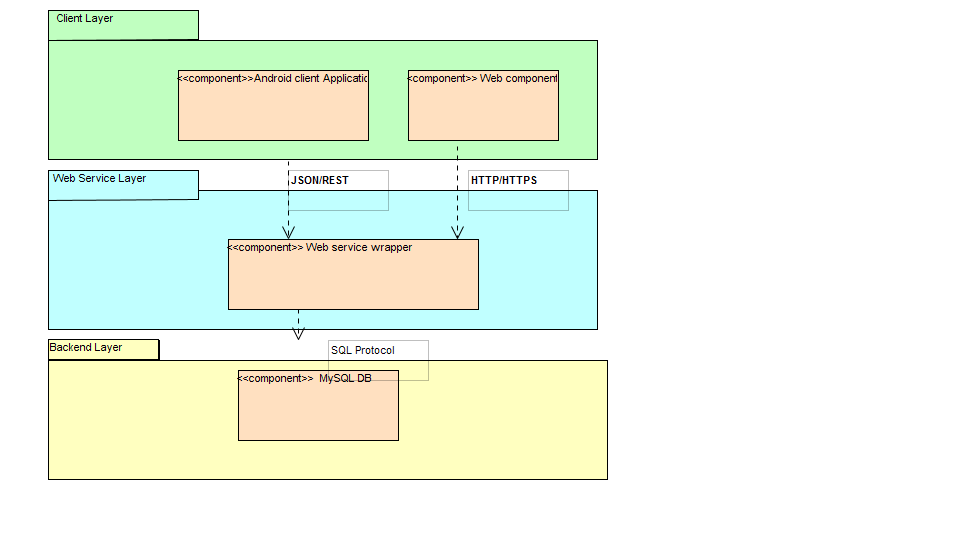
### 4.1.4 Architectural constraints

The system will use the following constraints:

- Android SDK and REST web services. The system will be deployed in Asus Nexus 7 OS Android 4.1 jelly bean.

Technologies to be used: - Java, PHP, HTML, JavaScript, MySQL, JQuery, CSS

## 4.2 Architectural Pattern



The Architectural pattern

1. Provides access to humans -> Client
2. Provides Functionality and objects required to client layer -> Web service
3. Host database -> Backend layer

The communication protocol are also shown. They include

1. HTTP/HTTPS from the browser to the web module.
2. JSON/REST/HTTP/HTTPS for the web services between the Android application and the database.

## 4.3 Architectural tactics or strategies

## 4.4 Use of reference architectures and frameworks

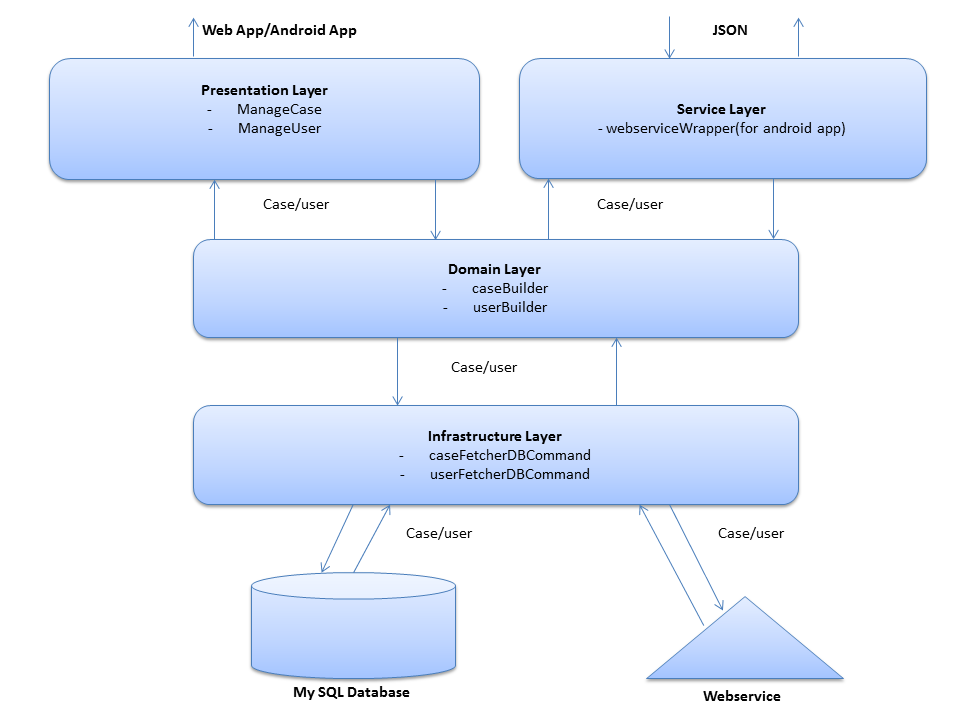


Figure 2. Three Layer Architecture

### 4.4.1 Presentation Layer

This User interface Layer. The UI is responsible for creating and displaying the user interface and handling user interaction. It’s going to be in Android App and Web App. It gets data from Domain layer.

### 4.4.2 Service Layer

This is the Web Service Layer. Responsible for showing web service API and returning method results as JSON. It gets data from Domain Layer.

### 4.4.3 Domain Layer

This is the Business logic, it is responsible for business logic of the application. All functions and objects used are going to be modelled here. It gets data from Infrastructure layer.

### 4.4.4 Infrastructure Layer

It responsible for querying database, calling web service and send emails.

# 5 Functional requirements and application design

**5.1 Functional requirements introduction**

This section introduces the detailed functional requirements of the proposed system. It also shows the use case diagrams for each sub system and the lower level processes that needs to be included to complete the functionality of the sub systems.

Priorities

Low: Not vital to the functioning of the system.

Medium: Standard system feature.

High: Critical feature

**5.2 Required functionality**

|  |  |
| --- | --- |
| Requirement name [1] | User Login |
| Priority | High |
| Description | Only people with valid user account details should log on to the system. |
| Motivation | We want to have control on who logs on the to system and does what. This is extremely important in order to maintain the integrity of the system. |
| Dependencies | User registration [2] |

|  |  |
| --- | --- |
| Requirement name [2] | User registration |
| Priority | High |
| Description | User can only be registered by administrator. |
| Motivation | We are restricting public and un-trusted parties to register on the system. Only specific trusted individuals must be registered on the system. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [3] | Data input and submission |
| Priority | High |
| Description | The user must be able to complete all fields of a form so that it can be submitted successfully. |
| Motivation | The application make use of google maps, weather service and camera when collecting data from the scenes. All this features must attached on the form so that it can be successfully completed. |
| Dependencies | GPS Location and time [4], Weather Services [5], Camera Integration [6] |

|  |  |
| --- | --- |
| Requirement name [4] | GPS Location and time |
| Priority | High |
| Description | The location of the incident where data is being collected will be auto captured with google map. More over the server time that the form was uploaded to server is auto captured. |
| Motivation | This feature is important for application to automatically capture the location of the device since it adds value on the integrity of the application. These location and time is going to be use on meta data of the form such as photos. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [5] | Weather Services |
| Priority | High |
| Description | The weather of a specific gps location captured is used to auto capture its weather from Open Weather service. |
| Motivation | This is feature is important for application to automatically capture the weather of that location where incident happed and also it add integrity to the application. |
| Dependencies | GPS Location and time [4] |

|  |  |
| --- | --- |
| Requirement name [6] | Camera Integration |
| Priority | High |
| Description | It required to take pictures of victims, objects and important features of the scene. |
| Motivation | This is one of core functionality that is needed for the application to achieve its main purpose. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [7] | Online |
| Priority | High |
| Description | The application should only work if the device is connected to internet. |
| Motivation | This is a core functionality, the system should only work with internet connection since it need to make use of online api’s. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [8] | Saving data |
| Priority | High |
| Description | The application should save data to device, after data is submitted successfully it should clear that data from the device. Even if the application loses connection it should save data to device. |
| Motivation | This is a core functionality that supports usability of the application. |
| Dependencies | Online [7] |

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| --- | --- |
| Requirement name [9] | Admin section |
| Priority | Medium |
| Description | The admin should be able to perform all his/her duties on the system and change any configurations on the system. |
| Motivation | Administrator should be able to change any settings of the application, manage users, manage data and all necessary duties. |
| Dependencies |  |

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| --- | --- |
| Requirement name [10] | Admin: view |
| Priority | Low |
| Description | Admin should not be able to view all levels in the system. |
| Motivation | This is to prevent administrators to collect data from scenes. |
| Dependencies |  |

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| --- | --- |
| Requirement name [11] | Admin: audit log |
| Priority | High |
| Description | This feature will keep track of who did what and when on the system. It will track all people who login on mobile and web applications. |
| Motivation | It’s important for accountability and keeping track of the system record as a whole. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [12] | Admin: report |
| Priority | Medium |
| Description | Administrator should be able to generate pdf report on data stored on the data base. |
| Motivation | This functionality will be need if there is a need to present paper based report. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [13] | View online submissions |
| Priority | Low |
| Description | Submissions should be available to be viewed by submitters(forensic officers), administrator and forensic practitioners |
| Motivation | This is needed for further inspection and analysis of data stored online. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [14] | Asynchronous Syncing |
| Priority | High |
| Description | The user’s submissions must run seamlessly and asynchronously in the background and should not depend on user interaction. |
| Motivation | This eliminates user error from our uploading/syncing process and improve the sync method and sync speed of our submissions to server. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [15] | Security: device restrictions |
| Priority | medium |
| Description | The application should be run on specific android tablet. This android tablet should only be restricted to specific users. |
| Motivation | Applying this requirement it will add more security since only specific people and device are exposed to our system. |
| Dependencies |  |

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| Requirement name [16] | Security: https connections |
| Priority | High |
| Description | The connection protocol on the server must be secure https protocol with valid certificate. |
| Motivation | This requirement is needed for application accreditation. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [17] | Security: sql injections |
| Priority | High |
| Description | SQL injections are a common way of pulling  information from a database without proper  authentication by means of using syntax  and causing the system to “fail” and result in  gaining access to data without permission |
| Motivation | Writing structures and code to prevent SQL  injections not only makes our code more  secure, but also makes the system more  abstract, robust and also speeds up  Database queries. |
| Dependencies |  |

|  |  |
| --- | --- |
| Requirement name [18] | Security: encryption |
| Priority | High |
| Description | Data that is uploaded to server will is encrypted using md5, sault or RSA. |
| Motivation | This is to make sure that data in the database remains meaningless to someone who manages to read it. |
| Dependencies |  |

**5.3 Use case prioritization**

1. Login (critical) All the system functionality should be accessible by users who are logged in.

2. Case management(critical) The system should be able to create a case, modify, view and assign a death register number; because this are the core functionalities of the system.

3. User management (important) the system must be able to allow only specific users to view specific information, this will ensure that the system is secured and privacy is maintained.

4. Reporting it will be useful for accountability and auditability.

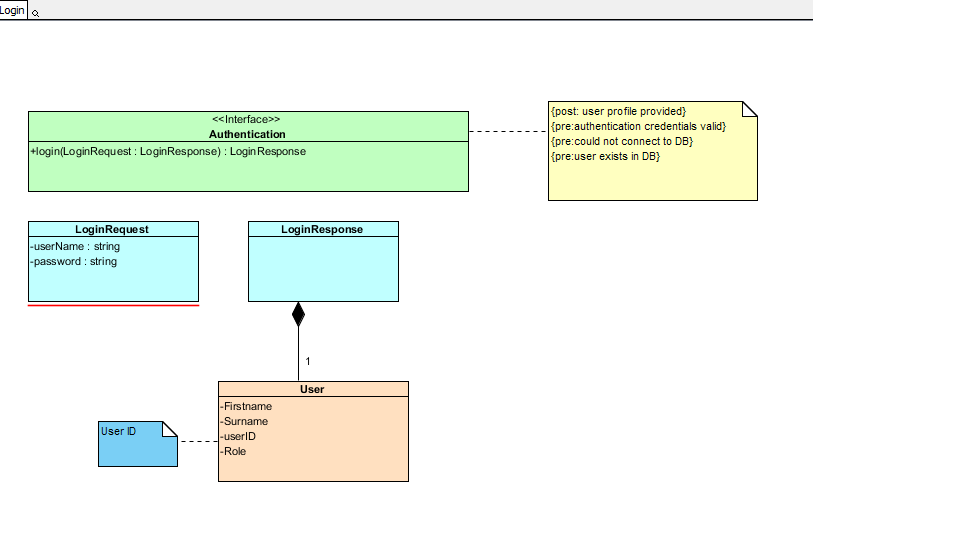
**5.4 Use case/Services contracts (N:B u need to arrange the pre and post conditions to the following)**

Pre: connect to the webserver.

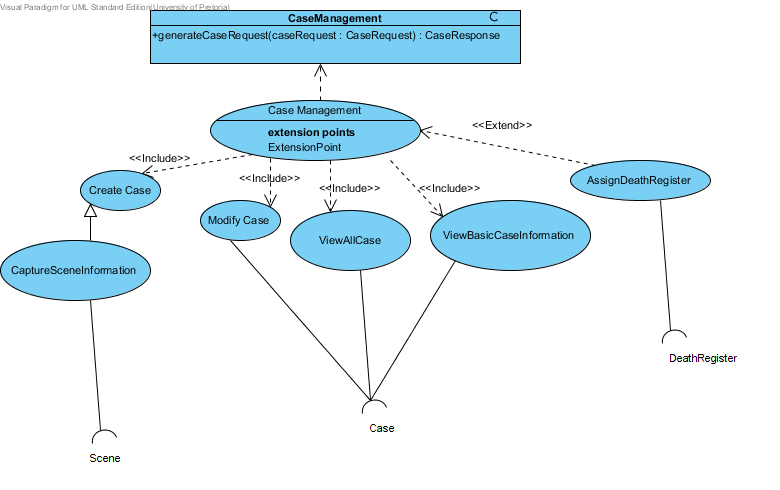
Pre: authenticate credentials, if not valid throw invalid credentials exception

Post: access to system granted

Post: user profile provided

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**Figure 10: Login Service Contract(copy the explanations from our previous doc)**

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**Figure 11: Case management use case**

• The case management functionality should allow the Forensic Officers to create new cases.

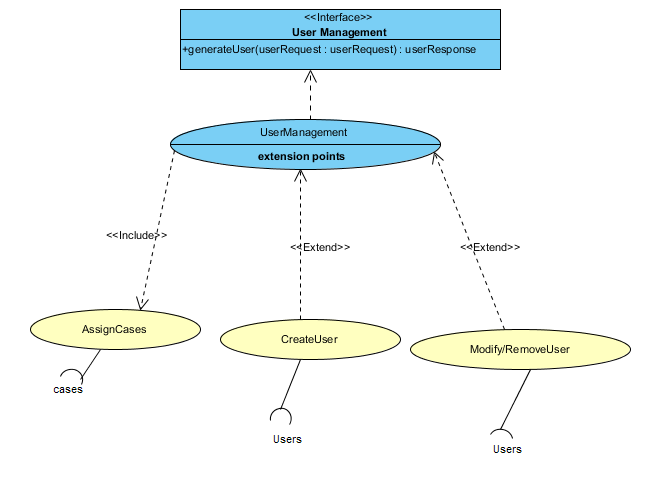
• Allows the Forensic Officers to view basic information of the case they created after submission.

• Allows the Forensic Practitioner to modify/add additional information on the case.

• Allows the Forensic Practitioner to view all cases.

• Allows the Forensic Practitioner to assign a death register to non-natural cases.

• Allows Masters and Honors students to view all cases they are assigned to.

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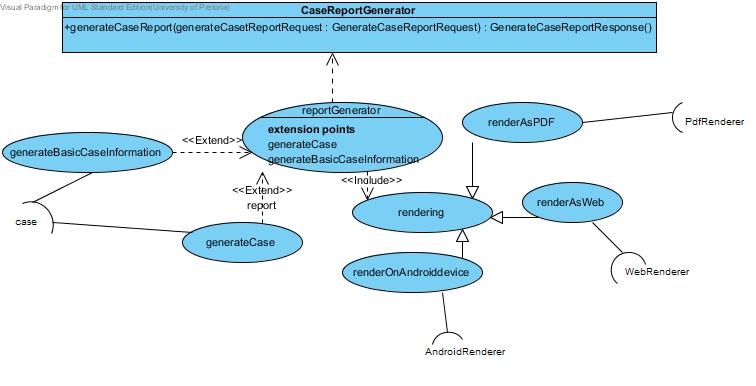
**Figure 12: User management use case**

• The user management functionality should allow the administrator to assign cases to students.

• Allows the administrator to add new users and assign access controls.

• Allows the administrator to modify user information (cellPhoneNumber, userPassword and other user personal details).

• Allows the administrator to remove users, in the form of deactivating their access to all the applications.

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**Figure 13: Report generator use case**

• The reporting functionality should allow different users to generate reports about cases, users and audit logs.

• It allows users to generate a report rendered on the web.

• It allows users to generate a report rendered on the android device.

• It allows users to generate a report rendered to pdf file.

**5.5 process view of M-Forensics**

**Add Process View of Rhino here…. Chage it to suit our spec**

**Figure 12: process view use case**

# 6 Glossary

* Forensic officer (FO) – a specially trained crime scene officer that collects the finding evidence that will be analyzed back at the lab by forensic scientist or forensic practitioner.
* Forensic practitioner (FP) - also referred to as crime scene investigators and forensic science technicians examine pieces of evidence to provide crucial support in criminal investigations. Their professional expertise is sought in laboratories, crime scenes and courtrooms
* Stakeholders - is anybody who can affect or is affected by an organization, strategy or project. They can be internal or external and they can be at senior or junior levels.
* Students – honors and masters students who are doing research as part of their studies.