

**MyTaxi**

**Integration Test Plan**

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1. **Introduction**
   1. **Purpose and Scope**

The purpose of this document is to verify functional, performance, and reliability requirements of the My Taxi service developed so far.

Since the project is vast and complex, it is useful to make this document in order to have a solid point of reference about ways and techniques of testing, and a schedule about the order of components to be tested.

* 1. **Glossary**

Below is reported the glossary already inserted in RASD and in the DD:

* + - CUSTOMER: a generic person that use any part of the system service, it could be either a user or a guest.
    - DBMS: Database Management System, the set of machines and specific operation that allow the right Database working.
    - ADMIN/ADMINISTRATOR: it is a particular type of user that has administrative functions.
    - GUEST: a person who has not signed up yet. Guests have no power until they sign up with one exception. If a Guest just want to call a taxi, it could simply insert its identification data.
    - USER: a person that has already signed up as a customer. It could call a taxi, as guest does, but it also could reserve it in advance, compiling a specific form.
    - TAXI DRIVER: a person who has signed up as a taxi driver. In order to complete its registration it has to provide its identification data and its driving license too.
    - SYSTEM: the environment formed by the application itself and its features.
    - CITY ZONE: each city is divided in zones. Every zone has approximatively the same territorial extension, so a city zone is one of the portions of the metropolitan area.
    - QUEUE: an ordered list of taxi drivers that have previously provided their availability.
    - CALL A TAXI: the action which can be performed both by guests and user, that consists in asking for a single taxi ride without any advance.
    - RESERVE A TAXI: the action that could be performed only by Users. A user can forward the request for a taxi from a specified place to another in advance.
    - SERVICE: the service that is provided by the application.
    - DENY/DENIAL: when a request is not satisfied. It produce the shifting of the considered taxi driver to the bottom of the queue.
    - ACCEPT: when a request, both coming from a reservation or a taxi call, is taken by a taxi driver who assumes the charge to bring passengers to the destination.
    - UI: the user interface i.e. the set of web pages that constitute the meeting point for users and system.
    - RASD: Requirement Analysis and Specifications Document
    - DD: Design Document
  1. **References**
* RASD
* Design Document
* Assignment 4 Integration Test Plan

1. **Integration Strategy**
   1. **Entry Criteria**

Before starting the testing process, every lowest-level component (like single Java classes) has to be checked alone. This means that every class code has been revised using code inspection, and every function has been tested alone.

It is also necessary to write and collect the documentation related to single classes, and previous RASD and DD are requested in order to know every detail and plan the testing in the best way.

* 1. **Elements to be integrated**

The elements that have to be integrated will correspond to the components already presented in MyTaxi Design Document, since they represent each one a stand-alone feature.

It is possible to identify three macro components in the Design Document, according to the three-tier structure [DD 2.1] which will represent our subsystems to be integrated:

* Client-tier subsystem: client side part of the system, which consists in a web browser for the web application and a mobile app for the mobile application.
* Business Logic-tier: the core of the system, it contains all the application logic.
* Persistence Module: it manages the data storage.

These macro components are themselves composed by some subcomponents that have to be integrated first following the rules explained in the next paragraph.

Another subsystem can be identified grouping all the external component used by the system. Further explanation will be in the paragraph 2.4.

In particular, Client-tier has a subcomponent for each different type of client [DD 2.7].

Several Web Services compose the Business Logic:

* Request Web Service
* Reservation Web Service
* Notification Web Service
* Queue Web Service, that logically contains one subcomponent for each queue zone
* Entity Manager Service, that contains a subcomponent for each entity defined by ER-Diagram [DD 5.1]

The persistence module contains the Database component and its related interface to the Business logic that now on we call DBMS.

* 1. **Integration Testing Strategy**

The integration strategy is based on a bottom-up approach. This choice depends on the fact that every smallest unit has already been tested, and so it is easier in this situation to put low-level components together and test every subsystem created. This method is therefore efficient, and saves time and resources since it is not necessary to create stubs and to simulate components behaviours.

Finally, high-level components are separated from lower tiers by using defined interfaces and are easy to design and implement, so it is useful to produce them in the last phase.

* 1. **Subcomponent and Subsystem Integration Sequence**

Here is presented the table with the specific components to be integrated during the development of the application. The components listed are in integration order: from the persistence module to the client tier every component is integrated systematically following the table (and the order described in the diagram).

It is clear that also the subsystem are integrated in the order of their subcomponents. The Persistence module is created first, then the Business Logic level and the Client tier.

Finally external services, until now replaced by stubs, are integrated to the application.

Database Structure (SQL file)

Persistence Module

Database Management System

Entity: User

Entity: Guest

Entity: Admin

User Manager

Entity: Taxi

Business Logic

Taxi Manager

Entity Manager

Request Manager

Entity: Queue

Queue Manager

Reservation Manager

Notification Centre

Web Application

Client Tier

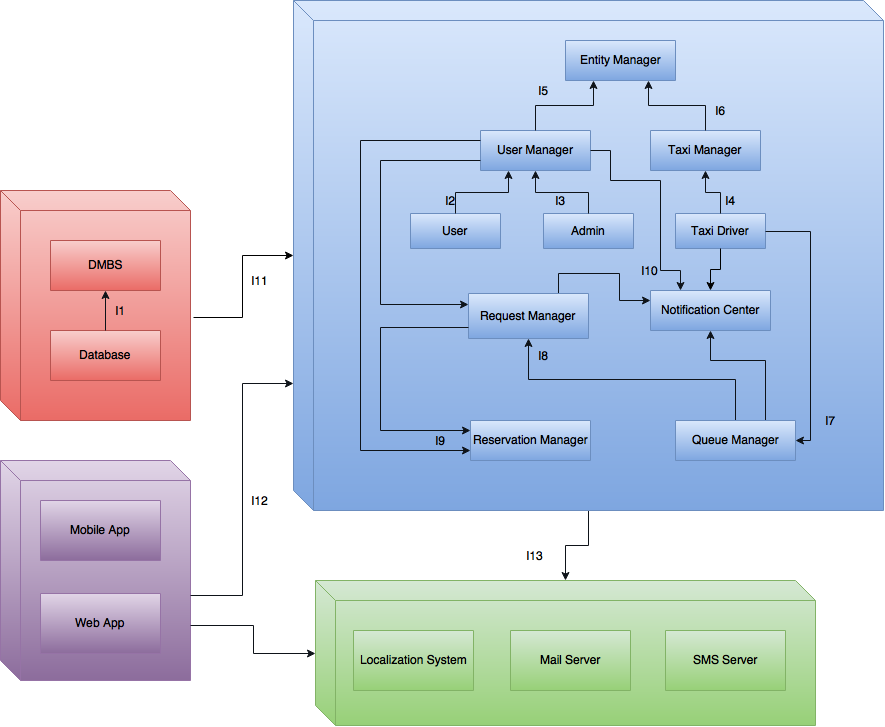
Mobile Application

Localization System

External Modules

Mail Server

SMS Server

****

The diagram above deepens the description of integration sequence. The internal component of each subsystem is integrated following the specific numeric sequence. After the integration of all the subcomponent of a subsystem, the next step is to integrate two subsystems among themselves.

1. **Individual steps and test description**
   1. **Persistence Module Tests (P)**

|  |  |
| --- | --- |
| **Test Case Identifier** | P I1 T1 |
| **Test Item(s)** | Database 🡪 DBMS |
| **Input Specification** | Create random queries |
| **Output Specification** | Check database structure and concurrency |
| **Environmental Needs** | N/A |

* 1. **Business Logic (B)**

|  |  |
| --- | --- |
| **Test Case Identifier** | B I2 T1 |
| **Test Item(s)** | User 🡪 User Manager |
| **Input Specification** | Generate typical User traffic |
| **Output Specification** | Check user management |
| **Environmental Needs** | N/A |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I3 T1 |
| **Test Item(s)** | Admin entity 🡪 User Manager |
| **Input Specification** | Generate typical Admin traffic |
| **Output Specification** | Check admin management |
| **Environmental Needs** | N/A |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I4 T1 |
| **Test Item(s)** | Taxi Manager 🡪 Taxi Manager |
| **Input Specification** | Generate typical Taxi Manager traffic |
| **Output Specification** | Check taxi management |
| **Environmental Needs** | N/A |
| **Test Case Identifier** | B I5 T1 |
| **Test Item(s)** | User Manager 🡪 Entity Manager |
| **Input Specification** | Generate typical User Manager traffic |
| **Output Specification** | Check generic entity manager |
| **Environmental Needs** | I2 and I3 tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I6 T1 |
| **Test Item(s)** | Taxi Manager 🡪 Entity Manager |
| **Input Specification** | Generate typical Taxi Manager traffic |
| **Output Specification** | Check generic entity manager |
| **Environmental Needs** | I4 test succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I7 T1 |
| **Test Item(s)** | Taxi Driver 🡪Queue Manager |
| **Input Specification** | Generate taxi driver availability |
| **Output Specification** | Check queue management |
| **Environmental Needs** | N/A |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I8 T1 |
| **Test Item(s)** | User Manager, Queue Manager 🡪 Request Manager |
| **Input Specification** | Generate typical request traffic |
| **Output Specification** | Check request management |
| **Environmental Needs** | I2, I3 and I7 tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I9 T1 |
| **Test Item(s)** | User Manager, Request Manager 🡪 Reservation Manager |
| **Input Specification** | Generate typical reservation traffic |
| **Output Specification** | Check reservation creation and management |
| **Environmental Needs** | I2, I3 and I8 tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | B I10 T1 |
| **Test Item(s)** | User Manager, Taxi Driver, Request Manager 🡪 Notification Center |
| **Input Specification** | Simulate typical notifications |
| **Output Specification** | Check notification behaviour |
| **Environmental Needs** | I2, I3, I7 and I8 tests succeeded |

* 1. **Subsystems Test**

|  |  |
| --- | --- |
| **Test Case Identifier** | S I11 T1 |
| **Test Item(s)** | Persistence Module 🡪 Business Logic |
| **Input Specification** | Simulate interactions between the two subsystems |
| **Output Specification** | Check |
| **Environmental Needs** | P block and B block tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | S I12 T1 |
| **Test Item(s)** | Client Tier 🡪 Business Logic |
| **Input Specification** | Generate typical client traffic |
| **Output Specification** | Check |
| **Environmental Needs** | B block and C block tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | S I13 T1 |
| **Test Item(s)** | Client Tier 🡪 External Applications |
| **Input Specification** | Simulate remote call to the external application |
| **Output Specification** | Check external applications compatibility and functionalities |
| **Environmental Needs** | C block tests succeeded |

|  |  |
| --- | --- |
| **Test Case Identifier** | S I13 T2 |
| **Test Item(s)** | Business Logic 🡪 External Applications |
| **Input Specification** | Generate remote calls to specific external applications |
| **Output Specification** | Check external applications compatibility and functionalities |
| **Environmental Needs** | B block tests succeeded |

1. **Tools and test equipment required**

* Apache JMeter: It is used to simulate a heavy load on a server or object to test its strength or to analyse overall performance under different load types;
* Junit: unit-testing framework for the Java programming language;
* Mockito: software used to mock missing components;
* Manual testing.

1. **Program stubs and test data required**

The chosen testing strategy minimize the stubs needed to test the components. However, in order to fully test the application, it is necessary to create some stubs to overcome the external components not yet available, like the localisation system, and the message and e-mail service.

It is also necessary to generate sample data in order to test both database operation, like insertion and deletion, and the business tier that needs data to manipulate.