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# 1. INTRODUCTION

A. Purpose:

In this document, we will extract requirements and make a comprehensive design for the Travelander+ application which provides an enhanced calendar with custom scheduling options to create appointments and offers travel planning assistance in between the arranged appointments for its possible users. The system aims to enable its users to add/edit appointments, choose mobility preferences and to offer them the best options for travelling from one appointment to another by regarding environmental conditions (such as traffic, weather etc.), user specific situations and preferences and efficient usage of time and other available resources.

### A.1 Goals

**Users:**

[G1]. Allows users to view his/her calendar.

[G2]. Allows users to add new event to the user if selected time slot is available.

[G3]. Users should receive a warning if the selected time slot is occupied or not feasible by considering place and time consideration.

[G4].Allows users to edit his/her events.

[G5].Allows users to delete his/her events.

[G6].Allows users to add customized break time with a certain duration defined in a certain time interval

[G7].Allows users to enter personal mobility preferences.

[G8].Allows users to choose predefined mobility preferences such as preference lists enforcing minimizing carbon prints, not driving car, not using public transportation etc.

[G9].Allows users to know mobility options which minimize travelling duration under user preferences, weather and traffic constraints.

[G10].Allows users to pin particular event by regarding importance of the event.

[G11]. User should receive alerts for the pinned events.

[G12].Allows users to add periodic events in daily, weekly and monthly basis.

[G13]. Allows users to activate or deactivate particular mobility options

[G14].

B. Scope:

Travelander+ will be the mobile and web application that enables to manage appointments and find best mobility options for its users. Its users can be everyone who needs to plan his/her long or short term schedule. Since the system is able to take information from various sources such as maps, traffic analysis on Internet, weather forecasting etc., Travelander+ is able to adapt the appointments and mobility options for maximizing efficiency on time and minimizing the latency and usage of other resources.

## C. Definitions, Acronyms, Abbreviations

## D. Revision history

## E. Reference Documents

## F. Document Structure

# 2. OVERALL DESCRIPTION

## A. Product perspective:

here we include further details on the shared phenomena and a

domain model (class diagrams and statecharts)

## B. Product functions:

here we include the most important requirements

## C. User characteristics:

here we include anything that is relevant to clarify their needs

## D. Assumptions, dependencies and constraints:

### D.1. Domain Assumptions

Our proposed system assumes that these assumptions hold for the domain that the system operates on:

1. During program working, operating device always receives Internet connection.
2. Information about weather forecasting and traffic conditions are published on Internet
3. Resources for the updated weather forecasting and traffic conditions always provide accurate information.
4. Information of public transportation is published on Internet.
5. Public transportation vehicles are assumed as punctual with their published programs.
6. Provided information of ticket prices, ticket seller locations and working hours, and stop locations of public transportation are always accurate.
7. Users who prefer driving have already driver license for the preferred vehicle if it is necessary (for motorbike, car etc.)
8. Users are able to ride bike when biking is activated as mobility option.
9. Shared bikes shown by the system exist in the indicated location by the system for that time instant.
10. Users are assumed to walk in (approximately) average speed.
11. Users do not have any disability related to walking if walking is activated as mobility option.
12. During mobile application operation, GPS is on and at working status while current position is needed.
13. GPS always provides accurate location position.
14. Each user has only one calendar
15. No user can be different places at the same time.
16. Users accurately enter location addresses and date-time of the events to the system.
17. Break duration is always equal or greater than given time interval for it.

### D.2 Dependencies

### D.3 Constraints

### D.3.1 Regulatory Policies

### D.3.2 Hardware Limitations

For the mobile application, user needs a device with:

* At least 3G Internet connection
* GPS Connection
* Compatible operating system (IOS or Android)
* Space for application

For the web page application user needs a device with:

* Wired or Wi-fi Internet connection
* Compatible Internet browser: Internet Explorer, Google Chrome, Mozilla Firefox, Opera

### D.3.3 Interfaces to other applications

System needs to communicate for up-to-date information collection of weather, traffic, transportation, car or bike share systems. Also, it needs to communicate and manage a database system for storing and updating user information.

3. SPECIFIC REQUIREMENTS:Here we include more details on all aspects in Section 2 if they can

be useful for the development team.

## A. External Interface Requirements

### A.1 User Interfaces

### A.2 Hardware Interfaces

### A.3 Software Interfaces

### A.4 Communication Interfaces

## B. Functional Requirements:

Definition of use case diagrams, use cases and associated

sequence/activity diagrams, and mapping on requirements

### B.1 Use Cases

|  |  |
| --- | --- |
| **Use Case 1** | Log in |
| **Actors:** | User |
| **Entry Condition:** | The user is signed up to the system. |
| **Flow of Events:** | 1. The user opens the Travlendar+ application on his/her device. 2. The system displays the main screen. 3. The user enters his/her e-mail address or user name and the predefined password. 4. The user selects log in. 5. The system displays the Mobility Suggestions for the day’s schedule. 6. The user selects OK. 7. The system displays tools menu with the profile information. |
| **Exit Condition:** | The use case terminates when the user is successfully logged in. |
| **Exceptions:** | * The user information entered by the user i.e. the email address/user name or the password is wrong hence an error message is displayed. |

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| **Use Case 2** | Add Event |
| **Actors:** | User |
| **Entry Condition:** | The user is logged in. |
| **Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user slides the screen down. 3. The system creates a new line on the top of the events list. 4. The user enters a name for the event. 5. The system directs the user to the calendar automatically. 6. The user selects the date that he/she wishes to add the event from the calendar view. 7. The user selects the event’s start and end time on the selected date. 8. The system directs the user to the map. 9. The user selects the event location by entering the specific location name or the address. 10. The user saves the event details. 11. Travlendar+ displays a confirmation message notifying the user that the event is added to the calendar. |
| **Exit Condition:** | * The use case terminates when the selected date and time is assigned to the new event. * The selected date and time interval is now unavailable to be allocated by any other new event to be added in the future |
| **Exception 1:** | * If the time interval on the date selected by the user is already assigned to another event, the system displays a warning message indicating that the desired date/time is unavailable. * The system displays another message after the warning asking the user if he/she would like to change the date/ time * If the user selects “Yes” the flow starts again from the second step. * If the user selects “No”, the use case terminates without any date/time allocation. |
| **Exception 2:** | * If the time interval on the date selected by the user is free but the location is unreachable for the selected time according to the system calculations based on the current schedule, the system displays a warning message indicating the event is unreachable. * The system displays another message after the warning asking the user if he/she would like to change the event location. * If the user selects “Yes” the flow starts again from the third step. * If the user selects “No”, the use case terminates without any date/time allocation. |

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| **Use Case 3** | Create Repeated Event |
| **Actors:** | User |
| **Entry Condition:** | The user is logged in. |
| **Normal Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user slides the screen down. 3. The system creates a new line on the top of the events list. 4. The user enters a name for the event. 5. The system directs the user to the calendar automatically. 6. The user selects the date that he/she wishes to add the event from the calendar view. 7. The user selects the event’s start and end time on the selected date. 8. The system directs the user to the map. 9. The user selects the event location by entering the specific location name or the address. 10. The user slides the map view to the left to see event details. 11. The system displays a list screen including the event details which are Name, Date/Time, Location, Duration and Frequency. 12. The user edits the frequency which is set to null as default based on the event’s nature (e.g. daily, weekly, monthly or customized (e.g. Weekly: Monday-Wednesday)). 13. The user may edit the duration which is set to the whole-time interval between the start and end time of the event as default based on the event’s nature (e.g. 45-minute lunch break between the selected start and end time). 14. The user saves the event details. 15. Travlendar+ displays a confirmation message notifying the user that the event is added to the calendar with the defined frequency. |
| **Exit Condition:** | * The use case terminates when, starting with the selected date, the selected time is duplicated according to the frequency, assigned to the event and added to the other dates on the calendar. * The selected dates and time intervals appearing on the calendar based on the frequency are now unavailable to be allocated by any other new event to be added in the future |
| **Alternative Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user selects the existing event he/she would like to repeat. 3. The flow continues as in the normal flow starting from the fifth step. |
| **Exceptions:** | * The system displays a warning message indicating the event cannot be repeated since one or more date/time that needs to be allocated based on the frequency are unavailable. * The system displays another message after the warning asking the user if he/she would like to change the date/ time or frequency. * If the user selects “Yes” the flow starts again from the sixth step. * If the user selects “No”, the use case terminates without any date/time allocation in the normal flow or only allocating the existing single event date/time in the alternative flow. |

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| **Use Case 4** | Edit Event Date/Time |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The event list is not empty. |
| **Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user selects the event he/she would like to edit. 3. The system directs user to the date selected on the calendar. 4. The user edits the date and/or time. 5. The system displays a message asking the user “Would you like to save the changes?”. 6. The user selects Yes. 7. Travlendar+ displays a confirmation message notifying the user that the changes are saved. |
| **Exit Condition:** | * The use case terminates when the new date and time is assigned to the event. * The new date and/or time interval is now unavailable to be allocated by any other new event to be added in the future. * The previous date and/or time assigned to the event is now available to be allocated by any other new event to be added in the future. |
| **Exceptions 1:** | * The user selects No after the system displays the “Would you like to save the changes?” message. * The use case terminates without changing the date and/or time of the event. * The event’s current date and time interval stays unavailable to be allocated by any other new event to be added in the future. |
| **Exceptions 2:** | * If the time interval on the new date and/or time selected by the user is already assigned to another event, the system displays a warning message indicating that the desired date/time is unavailable. * The system displays another message after the warning asking the user if he/she would like to change the date/ time. * If the user selects “Yes” the flow starts again from the fourth step. * If the user selects “No”, the use case terminates keeping the current date/time allocated. |

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| **Use Case 5** | Edit Event Location |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The event list is not empty. |
| **Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user selects the event he/she would like to edit. 3. The system directs user to the date selected on the calendar. 4. The user slides the screen to the left. 5. The system displays the location on the map view. 6. The user selects a new location by entering the address or the specific location name. 7. The system displays a message asking the user “Would you like to save the changes?”. 8. The user selects Yes. 9. Travlendar+ displays a confirmation message notifying the user that the changes are saved. |
| **Exit Condition:** | * The use case terminates when the new location is assigned to the event. * The event’s current date and time interval stays unavailable to be allocated by any other new event to be added in the future. |
| **Exceptions 1:** | * The user selects No after the system displays the “Would you like to save the changes?” message. * The use case terminates without changing the location of the event. |
| **Exceptions 2:** | * If the new location is unreachable for the selected time according to the system calculations based on the current schedule, the system displays a warning message indicating the event is unreachable. * The system displays another message after the warning asking the user if he/she would like to select another event location. * If the user selects “Yes” the flow starts again from the sixth step. * If the user selects “No”, the use case terminates keeping the current location unaltered. |

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| **Use Case 6** | Delete Event |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The event list is not empty. |
| **Flow of Events:** | 1. The user selects the My Events function from the Main Menu. 2. The user holds the event he/she wants to delete and slides it to the left. 3. The system displays a message asking the user “Would you like to delete this event?”. 4. The user selects Yes. 5. The system removes the event from the list and the calendar. |
| **Exit Condition:** | * The use case terminates when the event is removed from the list and the calendar. * The deleted event’s date and time interval is now available to be allocated by any other new event to be added in the future. |
| **Exceptions:** | * The user selects No after the system displays the “Would you like to delete this event?” message. * The use case terminates without removing the event from the list or the calendar. * The event’s date and time interval stays unavailable to be allocated by any other new event to be added in the future. |

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| **Use Case 7** | Sort Mobility Preferences |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The mobility option is active. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays all mobility options. 3. The user sorts the mobility options based on his/her preferences (e.g. if the user prefers to walk or ride a bike as much as possible he/she should put these options on the top of the list) by holding the option and swiping it to the desired row on the list or he/she can turn on the “Minimize Carbon Foot Print” option displayed at the end of the list and the options are automatically sorted to fulfill this goal. |
| **Exit Condition:** | * The use case terminates when the system saves the preferences to be used in the best mobility option algorithm. |

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| **Use Case 8** | Deactivate Mobility Option |
| **Actors:** | User |
| **Entry Condition:** | The user is logged in. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays all mobility options. 3. The user holds the mobility option he/she wants to deactivate and slides it to the left. 4. The system fades the deactivated option and puts it to the end of the list. |
| **Exit Condition:** | * The use case terminates when the system saves the mobility option’s state to be used in the best mobility option algorithm. * The customization and sorting options are unavailable for the deactivated mobility option. |
| **Exceptions:** |  |

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| **Use Case 9** | Activate Mobility Option |
| **Actors:** | User |
| **Entry Condition:** | The user is logged in. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays all mobility options. 3. The user holds the deactivated mobility option he/she wants to activate and slides it to the right. 4. The system brightens the activated option and leaves it at the end of the list. |
| **Exit Condition:** | * The use case terminates when the system saves the mobility option’s state to be used in the best mobility option algorithm. * The customization and sorting options are now available for the activated mobility option. |
| **Exceptions:** |  |

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| **Use Case 10** | Customize Mobility Option/ Restrict Undesired Time Interval |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The mobility option is active. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays all mobility options. 3. The user selects the mobility option he/she wants to customize. 4. The user selects a start and end time from the “Restricted Time Interval” drop down menu. |
| **Exit Condition:** | * The use case terminates when the system saves the custom preference to be used in the best mobility option algorithm. |
| **Exceptions:** |  |

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| **Use Case 11** | Customize Mobility Option/ Set Distance Limit |
| **Actors:** | User |
| **Entry Condition:** | * The user is logged in. * The mobility option is active. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays all mobility options. 3. The user selects the mobility option he/she wants to customize. 4. The user enters the maximum distance limit he/she would utilize the selected mobility option. 5. The user selects the unit of measure from the drop down list. |
| **Exit Condition:** | * The use case terminates when the system saves the custom preference to be used in the best mobility option algorithm. |
| **Exceptions:** |  |

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| **Use Case 12** | Edit Mobility Preferences |
| **Actors:** | User |
| **Entry Condition:** | The user is logged in. |
| **Flow of Events:** | 1. The user selects Mobility Option Preferences from the Main Menu. 2. The system displays the previously sorted and customized mobility options list. 3. The user edits his/her preferences (e.g. resorts the list, changes the customizations or activates a deactivated mobility option.) |
| **Exit Condition:** | * The use case terminates when the system saves the new preferences to be used in the best mobility option algorithm. |
| **Exceptions:** |  |

## C. Performance Requirements

## D. Design Constraints

### D.1 Standards compliance

### D.2 Hardware limitations

### D.3 Any other constraint

## E. Software System Attributes

### E.1 Reliability

### E.2 Availability

### E.3 Security

### E.4 Maintainability

### E.5 Portability

4. FORMAL ANALYSIS USING ALLOY:in this section you will include your Alloy model. We require

you to comment on the model by discussing the purpose of the model, what you can prove

with it and why what you prove is important given the problem at hand. You are also

required to show one or more worlds obtained by running your model.

5. EFFORT SPENT:In this section you will include information about the number of hours each

group member has worked for this document.

# 6. REFERENCES