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Software Engineering II project
Travlendar+
Implementation & Testing
Document
V1

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1 Introduction

1.1 Purpose

The main focus of our system design phase will be to create an application capable of reaching the vast majority of users. Thus the architecture must be designed with the intent of being maintainable and extensible, also foreseeing future changes. It should also be flexible enough in order to make future integration of features or adaptations and deploy on other type of platforms and devices as easy as possible. This document aims to drive the implementation phase so that cohesion and decoupling are increased in full measure. In order to do so, individual components must not include too many unrelated functionalities and they should reduce interdependency between one another.

1.2 Revision

1.3 Document Structure

This document is structured in seven sections, here is an overview of the contents of each and every one:

- **Introduction:** This section provides a general introduction and overview of the document.
- **Implemented functionalities:** This section provides the implemented functionalities in detail, explaining what an user can and cannot do, what the application itself allows and takes into account while performing its tasks.
- **Adopted development frameworks:** This section states the programming languages, the frameworks, middlewares and APIs we used to implement the application.
- **Source Code structure:** In this section the adopted programming style will be explained, the subdivision in packages and the code structure will be part of it.
- **Testing:** This section will contain the various test cases we performed and their outcome.
- **Installation instructions:** Here you can find all the instructions in detail about the installation process of Travlendar+.
- **Appendix:** Here we provide information about the used software and the effort spent to redact this document.

2 Implemented functionalities

The set of functionalities we actually implemented with respect to the ones we initially defined are:

2.1 [F1] Signup and Login

Travlendar+ users must sign up the first time they intend to use the App, further usages of the app will require a login to access all its functionalities. Logout which will invalidate the current session and take the user to the login page is also present.

2.2 [F2] Meeting creation

This is the most important function of the app, it allows to generate an event related to an appointment. It requires the user to define all the details such as date, time, location.

2.3 [F3] Preferences set up

An important feature of Travlendar+ consists in allowing the user to filter out specific routes depending on some constraints about the travel, or to set break-dedicated time slots. In particular the preferences we implemented are:

- Minimize carbon footprint option, the result of flagging this option is that if possible (there exist at least a route and the travel means constraints are satisfied) only walking, cycling and public transportations routes will be taken into consideration.
- Avoid tolls option which will only affect driving mode, only routes without tolls will be considered.
- Avoid motorways option which will only affect driving mode, only routes without highways (motorways) will be considered.
- Setting up a maximum walking distance and taking into consideration only the routes which satisfy this constraint
- Setting up a maximum cycling distance and taking into consideration only the routes which satisfy this constraint
- Setting up a time from which the routes involving public transportations will be discarded, in particular, the User can select the time between the range 18:00 and 5:30, from that time till the morning any route involving public transportations will be avoided.
- Specifying the travel means the user intends to use for his travels, possible travel means are:

- Owned car
- Shared car
- Owned bike
- Shared bike
- Walking
- Public transports

2.4 [F4] Warnings management

In case a warning is generated by the system due to a possible overlap among two or more meetings, the user must solve the warning. In other words, the user has to decide whether he wants to ignore the warning notification or he intends to modify some meetings to be sure that he can reach and participate to all his appointments. In particular the warning are created if... blah blah

2.5 [F5] Route generation

When requested, the app is able to find a route, if possible, from the specific location the user is at in the moment to the location of the considered meeting, the suggested travel will fit and satisfy the selected preferences.

2.6 [F8] Update/Delete meeting

This function is both basic and relevant, it allows the user to customize his meetings after their creation. In particular, everything except the name (since it's part of the identification of the meeting) can be modified.

2.7 [F9] Add/Delete break

This feature at first was specified as part of the preferences, however, since we considered that this is one of the main features, we named it alone as an independent functionality. The Flexible break is a slot of time in the day to be reserved for specific purposes (such as a lunch for example), the break has a starting time and an ending time, which are the extremes times in which the break must be contained, the break itself however will only last the time specified by the Duration attribute. The day to specify for the break is in the form of the day of week (monday, tuesday, ecc.), which means the first occurrence of that day of week from the creation time. The Break could also be recurrent, which means every week in that day of the week a break will be scheduled. The break is flexible in the sense that the actual break only lasts for a time specified by the duration and Travlendar will make sure that the user has at least that free time available inbetween his meetings, if not a Warning will be generated.

2.8 [F10] Search meeting

An added functionality with respect to the ones we initially defined is the search meeting, it allows the user to search for a meeting by typing part of the name, the result will be the page of the best match meeting page, if any.

3 Adopted development frameworks

3.1 Adopted programming languages

To implement Travlendar+ we mainly used Java. The front-end was created using HTML, css and javascript while the back-end is plain Java and for it we adopted some of the functionalities that JEE provides.

3.2 Adopted middlewares and libraries

The only middleware used is Glassfish Web server, it provided us with the functionality of using the Java Persistence API framework in an easy way, allowing us to define and create the entities in the database and mapping them to Java classes. The only library we used is json.simple, a library to simply parse the JSON files arrived as a response by the Google Maps APIs in order to retrieve specific and useful information.

3.3 Used APIs

The main APIs we interfaced with are Google Maps APIs, such as:

- Google Maps Distance Matrix API to: Estimate travel time and distance from origin to destination.
- Google Maps Directions API to: Calculate directions between origin to destination specifying the means of transport.
- Google Maps Place Autocomplete to: Input real addresses for meetings avoiding misspelling of addresses

4 Source Code structure

5 Testing

6 Installation Instructions

6.1 System Requirements

6.1.1 JDK

In case you don't have any version of Java Development Kit you should download its latest version from:

<http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>

6.1.2 Glassfish Web Server

Being Travlendar+ a web application, it is essential to have a web server installed, here we provide information about the installation and deployment on Glassfish 4.1.1. You can download it from

<https://javaee.github.io/glassfish/download>

or alternatively, you can follow the quick installation instructions for Windows, which includes a Glassfish installation.

6.1.3 DBMS

For simplicity, we decided to use the basic DBMS provided by glassfish, Apache Derby RDBMS, thus you do not need anything else if you have installed Glassfish Server.

6.1.4 Browser

For the development and testing we always used Google Chrome as browser, we recommend installing the latest version of Chrome and we do not guarantee the absence of bugs and poor performances on other Browsers, even if they would probably work just as fine.

6.2 Quick Installation for Windows

The quick installation consists in downloading Glassfish 4.1.1 with the script to install Travlendar and the war file already in it.

- Download the JDK if you don't have it already from <http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>, usually it is stored in C:\Program Files\Java, put it there or wherever you prefer, keep in mind or save the path where you put it.
- Download the zip at: <https://>, unzip the folder and put the folder glassfish-4.1.1 it contains in C:\Program Files.
- Open the glassfish-4.1.1 folder and double click on installtravlendar file.
- Click yes to the popup that asks if you want to run it as administrator.

- Write down in the Command Prompt the JDK path when asked for it, for example write: `C:\Program Files\Java\jdk1.8.0_121`
- Press enter.
- If everything went fine the default browser should have been launched and you should see the login page of the app, signup and enjoy the app.

6.3 Manual installation - Environment Setup

6.3.1 Starting up Glassfish Server

- On Windows, open command prompt as administrator (right click on `cmd.exe` and click Run as administrator), on Linux or MacOS open Terminal.
- browse to Glassfish installation path and open bin folder, usual installation path on Windows: `C:\Program Files\glassfish-4.1.1\bin`, execute command `cd C:\Program Files\glassfish-4.1.1\bin`
- execute command `asadmin start-domain`

A screenshot of a Windows Command Prompt window. The title bar reads "Amministratore: Prompt dei comandi - asadmin start-domain". The window content shows the following text:

```
Microsoft Windows [Versione 6.3.9600]
(c) 2013 Microsoft Corporation. Tutti i diritti riservati.

C:\windows\system32>cd C:\Program Files\glassfish-4.1.1\bin
C:\Program Files\glassfish-4.1.1\bin>asadmin start-domain
Waiting for domain1 to start ....
```

Figure 1: Commands to execute in order to start Glassfish Server

After the server has started you will be able to access the Admin Console at <https://localhost:4848> and the web server at <https://localhost:8080>
(If you need to stop Glassfish server just execute command *asadmin stop-domain*)

6.3.2 Setting up JDK path

Sometimes an error is displayed if Glassfish does not find the JDK automatically, you can execute the command
asadmin set "server.java-config.java-home=C:\Program Files\Java\jdk1.8.0-121"
Just substitute *C:\Program Files\Java\jdk1.8.0-121* with your path to the JDK you previously downloaded.

6.3.3 Database configuration

In order to make it simpler to create the database you can download the already configured Derby database from <https://linkdropbox>
Unzip it and put it in the folder: *.\glassfish\databases*
in the glassfish installation path (on Windows usually
cd C:\Program Files\glassfish-4.1.1

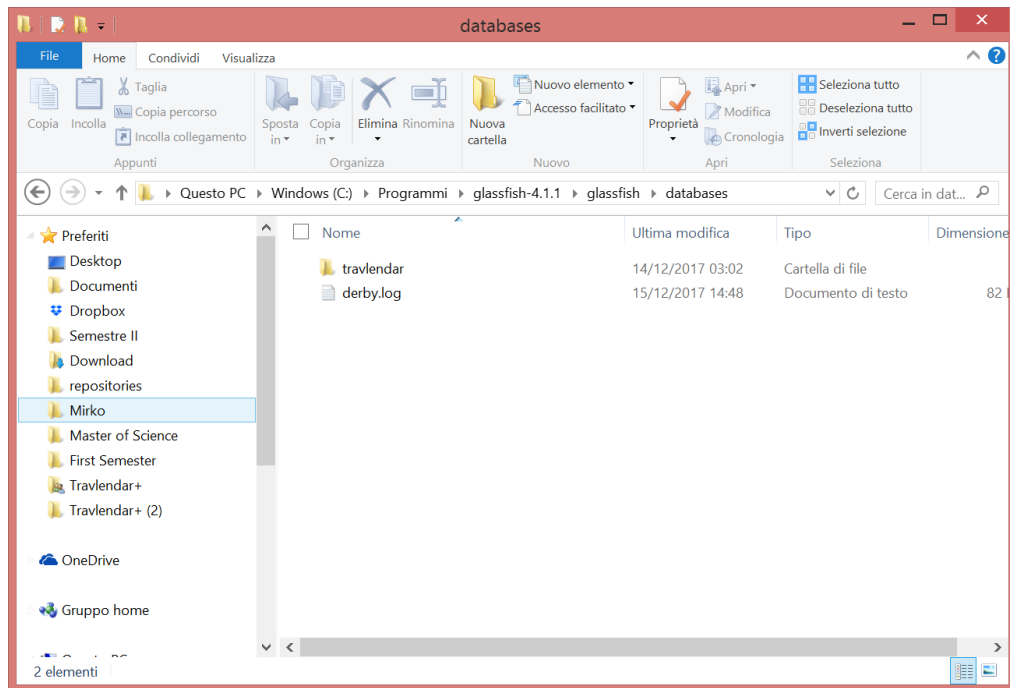
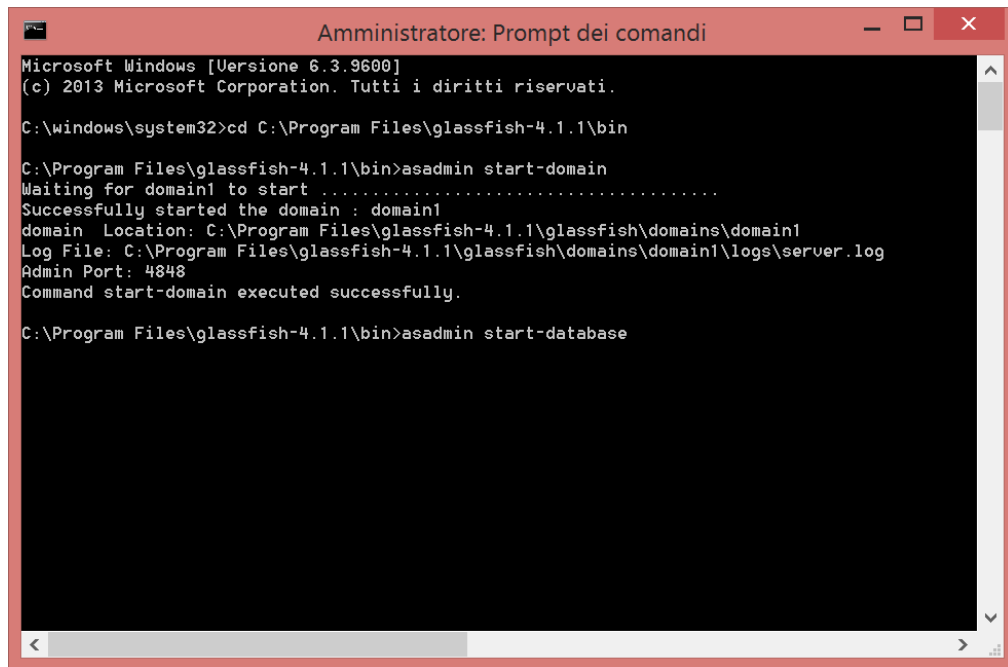


Figure 2: Location in which the database should be stored

6.3.4 Starting Apache Derby DBMS

Execute command
asadmin start-database
 in order to start the database.



```
Amministratore: Prompt dei comandi
Microsoft Windows [Versione 6.3.9600]
(c) 2013 Microsoft Corporation. Tutti i diritti riservati.

C:\windows\system32>cd C:\Program Files\glassfish-4.1.1\bin

C:\Program Files\glassfish-4.1.1\bin>asadmin start-domain
Waiting for domain1 to start .....
Successfully started the domain : domain1
domain Location: C:\Program Files\glassfish-4.1.1\glassfish\domains\domain1
Log File: C:\Program Files\glassfish-4.1.1\glassfish\domains\domain1\logs\server.log
Admin Port: 4848
Command start-domain executed successfully.

C:\Program Files\glassfish-4.1.1\bin>asadmin start-database
```

Figure 3: Commands to execute in order to start Apache Derby DBMS

Be sure the port is the default one (1527).
If at any moment you want to stop the database just execute command
asadmin stop-database

6.4 Application Deployment

After having configured and set up the environment, download the **.war** file **Travlendar.war** at
link release in github.
You can now follow one of these ways in order to deploy the Application on
Glassfish.

6.4.1 Manual deployment from Admin Console

After the server has started you will be able to access the Admin Console at
<https://localhost:4848>
Click on **Applications** tab on the left. Then click **Deploy...** button.

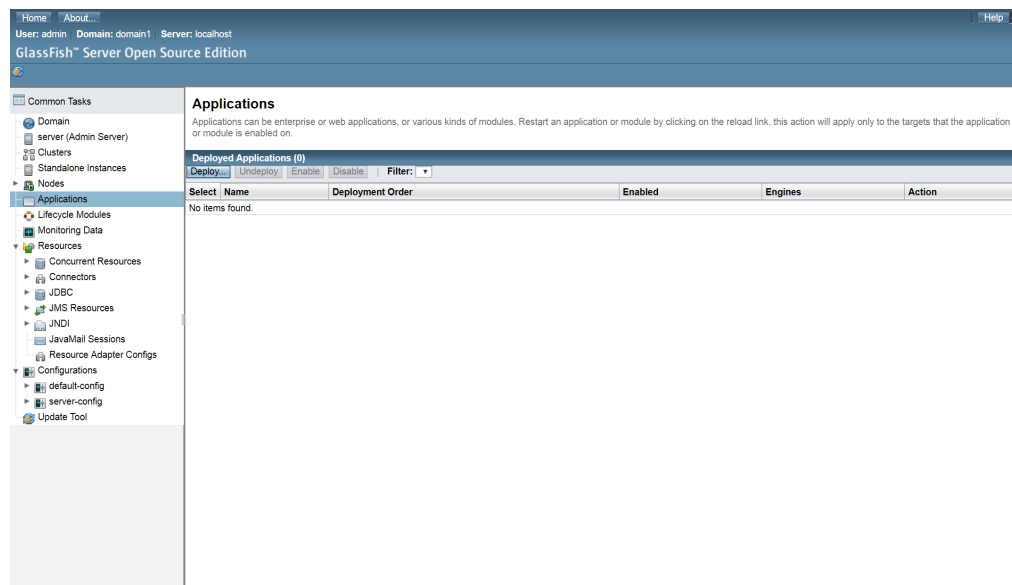


Figure 4: Glassfish admin console

Click on **Choose file** and select the **Travlendar.war** release file previously downloaded, then click ok.

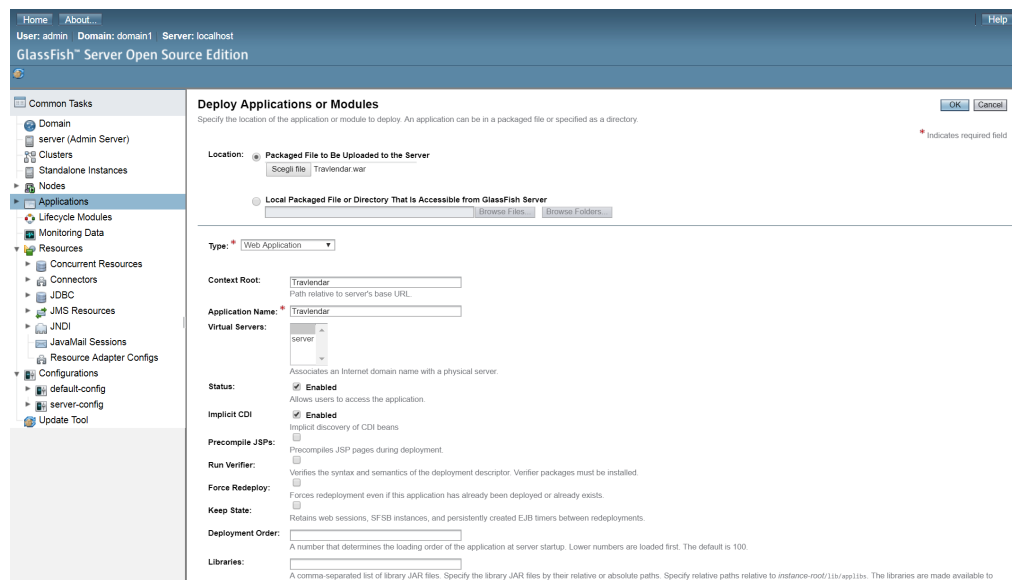


Figure 5: Glassfish admin console

If everything went fine you should see something similar to this.

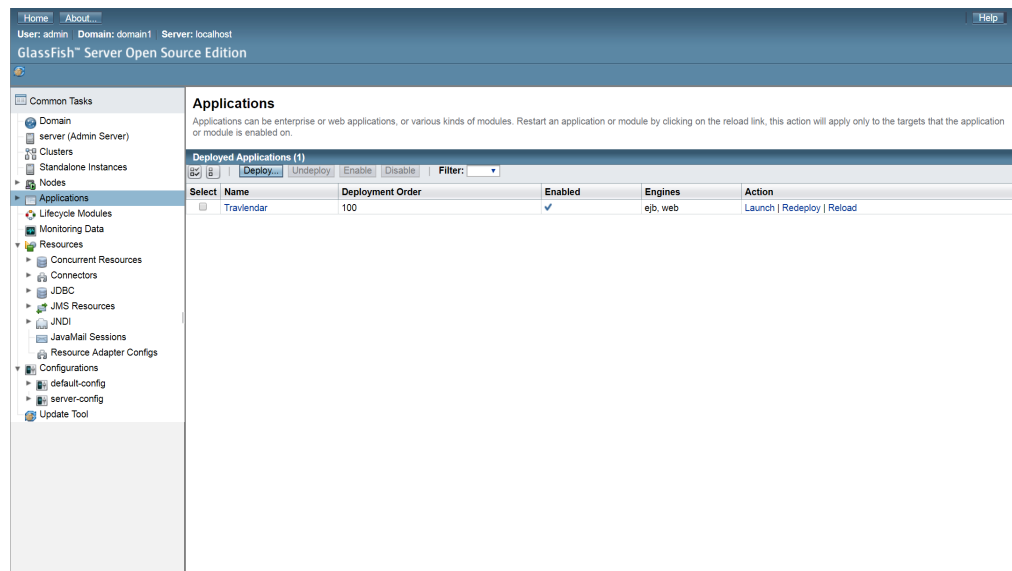
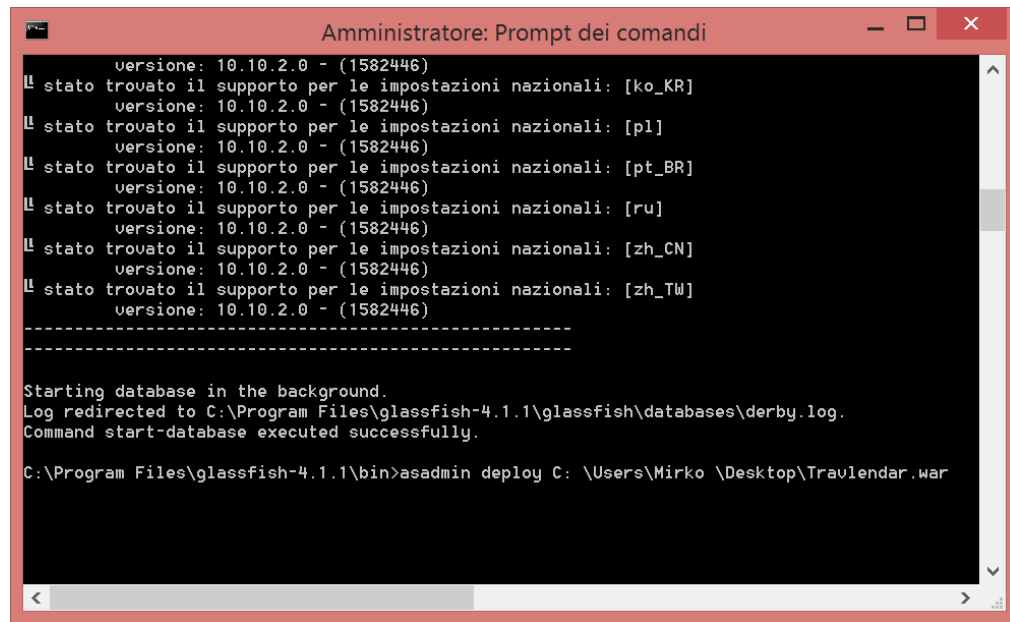


Figure 6: Glassfish admin console

Just click on **Launch** to start the application.
You can access the application opening the URL:
`https://localhost:8080/Travlendar`

6.4.2 Manual deployment from Command Line

Supposing you already started the server and the database, and you are in the `bin` folder in the Glassfish installation path, just execute `asadmin deploy C: \Users\Mirko \Desktop\Travlendar.war` substituting `C: \Users\Mirko \Desktop\` with your path to `Travlendar.war` release file.



```
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [ko_KR]
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [pl]
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [pt_BR]
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [ru]
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [zh_CN]
versione: 10.10.2.0 - (1582446)
stato trovato il supporto per le impostazioni nazionali: [zh_TW]
versione: 10.10.2.0 - (1582446)
-----
Starting database in the background.
Log redirected to C:\Program Files\glassfish-4.1.1\glassfish\databases\derby.log.
Command start-database executed successfully.

C:\Program Files\glassfish-4.1.1\bin>asadmin deploy C: \Users\Mirko \Desktop\Travlendar.war
```

Figure 7: Commands to execute in order to Deploy the application on Glassfish Server

You can now access the application by executing `start http://localhost:8080/Travlendar/` on Windows, `open http://localhost:8080/Travlendar/` on MacOS X, or `xdg-open http://localhost:8080/Travlendar/` on Linux, or simply open the browser and type `localhost:8080/Travlendar` in the URL bar and press Enter.

6.4.3 Autodeployment

Just put the `Travlendar.war` file in `jGlassFish-Installation-Path\domains\domain1\autodeploy` and restart the server.

6.5 Running the app

Once the deployment is finished you can access the Application at *localhost:8080/Travlendar* on a browser in your local machine, at *192.168.1.3:8080/Travlendar* on a device connected to the same LAN (just replace *192.168.1.3* with the private IP address of the machine the server is running on).

You can even access the application from a remote device, you just need to open the port 8080 of the router of your LAN by creating a virtual server and NATting the external access onto the private IP address of the machine your server is running on (private IP should be configured as static). Then you can access from wherever you want just by going to *xx.xx.xx.xx:8080/Travlendar*, replace *xx.xx.xx.xx* with the public IP address of your router.

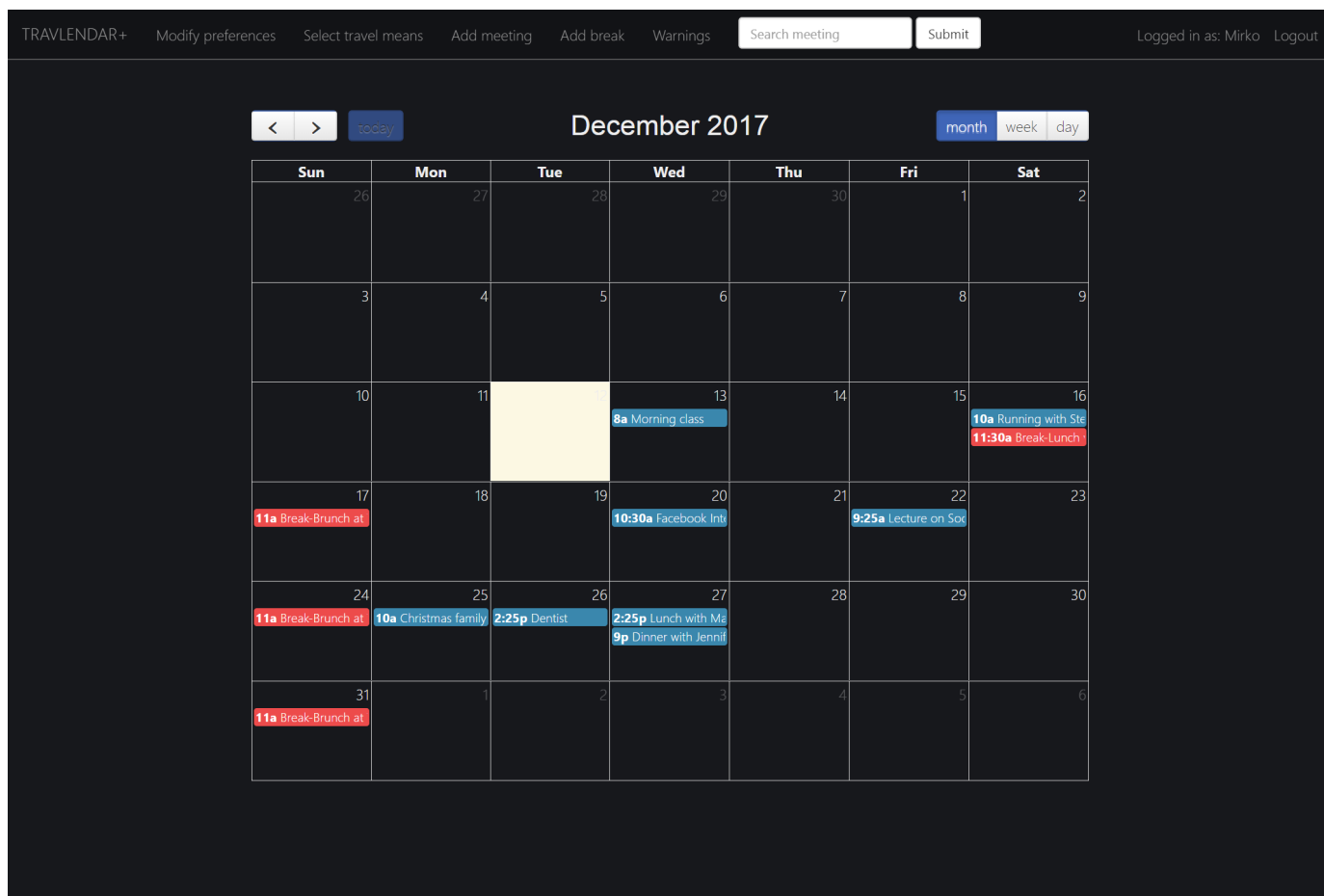


Figure 8: Travlendar Homepage

6.6 Possible issues and solutions

If you encounter any problem in the deployment regarding a database connectivity problem you could download Netbeans IDE (which includes Glassfish and Derby installation) and replace the Environment setup steps by creating a database with `databasename = travlendar`, `name = mirko`, `password = mirko`. Start glassfish server from there and then pass to the deployment phase as explained in these instructions.

If also this does not let you deploy the app as last chance you could clone the travlendar repository, import it as a project in netbeans build and clean the project, and run it.

7 Appendix

7.1 Used software

Task	Software
Edit and compile L ^A T _E X code	TeXmaker, TeXstudio
Development IDE	Netbeans
Application server	Glassfish 4.1.1
DBMS	Java DB (Derby)
Performance Testing	JMeter
Unit Testing	JUnit
Testing	Mockito

7.2 Effort spent

- Matteo Marziali working hours: ≈ 100 hours
- Mirko Mantovani working hours: ≈ 100 hours