GUI for a Journey Planner on l.de for Leipziger Verkehrsbetriebe

Leipziger Verkehrsbetriebe (LVB) is the public transport provider of the city of Leipzig. An important part of their service is the provision of a digital journey planner. LVB offers an app (LeipzigMOVE) for that purpose as well as a journey planner on their website (<https://www.l.de/en/mobility/trip-planner/>, in short l.de). The journey planner in LeipzigMOVE uses an implementation of OpenTripPlanner (OTP) that is developed in-house. OTP is an open-source project that provides a component to find itineraries combining public transport, pedestrian, bicycle and car segments.

The journey planner that is currently available on l.de is a third party component that does not use LVB’s in-house OTP to find itineraries. The goal of the project is a new graphical user interface for l.de that supports the search for itineraries via LVB’s OTP and shows its results.

# Requirements

* Accessibility of the web app is important. It should be considered from the beginning and the app should be as accessible as possible.  
  Basis for Accessibility on l.de is the Web Content Accessibility Guidelines (WCAG 2.1) conformance level AA and the European Norm EN 301 549, version 3.2.1.
* The web app should be usable on desktop, tablet and mobile devices, and should support resolutions that are commonly supported by modern websites.
* The language of the application should be German and English, with German being the default.  
  For the correct terminology in the UI, please refer to the existing planner on l.de, and please inquire with LVB if something is missing.
* Regarding UI/UX, we recommend looking at the website of the Helsinki transport authority <https://www.hsl.fi/en> - their implementation exceeds the needs and possibilities of LVB but can serve as general reference and inspiration

## Use Cases

The prioritisation is very coarse and should only give an initial overview which user stories we deemed essential.

### Prio 1

Journey plan

As a user,

* I want to plan a journey that has a point of departure and a point of arrival. Those points can be stops, addresses and points of interests.
* I want to enter a date/time that can be either a departure time or an arrival time to plan my journey.
  + The default should be a departure time that is set to the current time at which the website has been loaded.
  + There should be one input field for a date/time.
  + It should be possible to switch if the entered date/time is the departure or arrival time without clearing the entered date/time.
* I want to enter date/times that are in the future (no limitations) or in the past (up to 3 weeks) for convenient planning and to be able to evaluate journeys taken in the past.
* As soon as the minimum required information is given (on blur), I want to see the results for the journey planning in the Itinerary Overview. Minimum required information: Point of departure, point of arrival, departure/arrival time.
* As soon as I make a change to the journey plan (changing point of departure/arrival, time, a routing parameter), I want to see an updated Itinerary Overview (on blur).
* I want to receive user-friendly feedback if an input is missing or not in the correct format so I know at which place I need to add or correct something.

Itinerary Overview

As a user,

* I want to see five itineraries as a result for my journey plan in an overview after the request has been processed. For each itinerary, I want to see:
  + The planned departure and arrival time of the itinerary
  + The duration of the journey
  + The amount of transfers (can also be visually determined, I do not require a number)
  + Which routes will be used in which order, incl. walking; I want to see the route number as well as the modes of transport
  + If there is more than one leg, I want to get a quick grasp (visually) what share of time each leg amounts to in order to be able to select my desired combination of modes
* I want to access the Itinerary Detail View in order to gather more information on the itinerary.

Itinerary Detail View

As a user,

* I want to see the point of departure and point of arrival, be it an address, stop or point of interest
* I want to see planned departure and arrival times of all legs of the itinerary
* I want to see the walking duration and walking disctance of walking legs (including walking legs between stops as part of transfers)
* I want to see boarding and alighting stops of all legs of public transport
* I want to see the route name, route colour and headsign of public transport legs
* I want to see the duration of the journey

### Prio 2

Journey Plan

As a user,

* I want to receive suggestions for stops, addresses and points of interests when starting to type to enter a point of departure/arrival for my convenience and to make sure only valid entries are entered.
* I want to be able to distinguish if a suggestion is a stop, an address or a point of interest to make an informed decision which suggestion to select.
* I want to switch my input for point of departure and arrival easily to plan my journey in the other direction.
* I want UI support when entering the date/time for my convenience and to make sure only valid entries are entered.
* I want to customize journey planning. The customization area should not be visible in the initial view of the Journey Plan. The customization area should be easily accessible.
* I want to be able to set the modes of transport (customization). It should be possible to switch the usage on/off of:
  + Train
  + Suburb (S-Bahn)
  + Tram
  + Bus
* Default: all modes of transport should be selected
* I want to be able to plan a journey that avoids transfers (customization) because I might prefer staying in the same vehicle for a journey even if it takes longer.
* I want to be able to plan a journey with the least amount of walking (customization) because the weather might be bad or I am not well even if the journey takes longer.
* I want to receive information about the meaning of a symbol that is displayed in the UI if I request it so I can learn what the meaning is.

Itinerary Overview

As a user,

* I want to see additionally for each itinerary:
  + The real time departure and arrival time of the itinerary
  + The headlines of alerts, if there are alerts given; depending on the type of alert, a fitting symbol should be displayed in front of the alert headline
* I want to see a map in which departure and arrival point are marked and can be distinguished as such. The zoom of the map should be sensible for the locations of departure and arrival.
* I want to increase the number of displayed itineraries towards an earlier or later departure time in order to find an itinerary that better fits my needs.
* I want to see which parameters have been set for the planning while viewing the itineraries to have this information available at a glance to be able to decide if I need to make changes.
* I want to see the price of a regular single use ticket for this itinerary to evaluate different options.

Itinerary Detail View

As a user,

* I want to see real time departure and arrival times of all public transport legs of the itinerary
* I want to see real time adjusted arrival time if the last leg is a walking leg
* I want to see details to alerts if alerts are given, using the same symbols that have been used in the overview
* I want to be able to see intermediate stops if they exist
* I want a to toggle the view of intermediate stops on/off; initial setting: toggled off
* I want to be able to switch between the itineraries that are available in the overview without going back to the overview, to conveniently switch between itineraries
* I want to see the price of all available tickets for this itinerary upon

# Technical Information

## Technical Requirements

The preferred react framework is nextJS.

Eslint and prettier should be used.

The application should use the routing ([https://api.lmservices.mobilityinnovate.net/apidev/otp/api-docs/](https://es.sonicurlprotection-fra.com/click?PV=2&MSGID=202501141700180103060&URLID=17&ESV=10.0.31.8089&IV=C22E3A16F22ED8B85700445661CDDDA4&TT=1736874020287&ESN=izAs2sO9GIUSKt3HkWArCxCot%2BlomnbGCjTUXY9nKFM%3D&KV=1536961729280&B64_ENCODED_URL=aHR0cHM6Ly9hcGkubG1zZXJ2aWNlcy5tb2JpbGl0eWlubm92YXRlLm5ldC9hcGlkZXYvb3RwL2FwaS1kb2NzLw&HK=880C9CBDD8BF2AB7C5CE82E429C177AB1DD15A1AB621DD005F4F9707ED6A8BC9)), autocomplete ([https://api.lmservices.mobilityinnovate.net/apidev/autocomplete/api-docs/](https://es.sonicurlprotection-fra.com/click?PV=2&MSGID=202501141700180103060&URLID=15&ESV=10.0.31.8089&IV=EAF68EF8A4D65F514EF2DCDB14BEC18D&TT=1736874020287&ESN=2i7OReyBeMn6zHEnbBx%2BJGgK%2FSz38gqGWi2LUdN7hCI%3D&KV=1536961729280&B64_ENCODED_URL=aHR0cHM6Ly9hcGkubG1zZXJ2aWNlcy5tb2JpbGl0eWlubm92YXRlLm5ldC9hcGlkZXYvYXV0b2NvbXBsZXRlL2FwaS1kb2NzLw&HK=9B102BDEB2C2405832C0B6BD257C1B814ED88A9821235DC71480926D14E634B2)) and stopmonitor ([https://api.lmservices.mobilityinnovate.net/apidev/stopMonitor/api-docs/](https://es.sonicurlprotection-fra.com/click?PV=2&MSGID=202501141700180103060&URLID=13&ESV=10.0.31.8089&IV=24968EAF120E3BCA2B9BF77A6A0655E8&TT=1736874020287&ESN=XTBuvY6fyI2WxQJbpk6eLjt7pEYnUcDiWdgPq9qSKIM%3D&KV=1536961729280&B64_ENCODED_URL=aHR0cHM6Ly9hcGkubG1zZXJ2aWNlcy5tb2JpbGl0eWlubm92YXRlLm5ldC9hcGlkZXYvc3RvcE1vbml0b3IvYXBpLWRvY3Mv&HK=FDB9940AFEC6F7AC81F1490E015EAFA8C012CA8284FE0C2EA1B545A85A458616)) APIs of the LVB. No backend is required, it is sufficient to develop a frontend application and deploy it as GH page for a demo.