38883171 – Reflective Report – Sprint 3

Requirements:

This sprint, my main deliverables were centered around improving the general user experience when using our application. The main objectives of the sprint were:

- Make the webapp usable for mobile users.
- Get user's location from browser and implement related functionality.
- Map reacts to selections in the ControlPanel.

Architecture:

Main View on mobile:

The design paradigm of the Main View had to be chosen carefully. This component contains both ControlPanel and map, and is in charge of placing them in a cohesive single view. On large horizontal resolutions, such as with desktops of tablets, the existing horizontal implementation works without issues. The ControlPanel and MapWidget are placed in a size-flexible single column, allowing it to adapt to varying degrees of variation in the x-axis resolution.

The issue came when the user was using a mostly y-axis resolution. The columnar approach stop being an effective way to display the information. To solve this problem, a new vertical mode was activated after the resolution reached x width.

The initial approach was to simply stack the components in a row. This didn't work very well due to the changing size of the control panel, often resulting in the map not being visible and it resulted in a bad experience for users. As an alternative, an overlay concept with an ControlPanelIsActive state was utilized. When inactive, the controlPanel was shrunk, leaving more space for the map. To enable and disable the ControlPanel both a click and a drag interaction was added, making it friendly for all kinds of users.

Retrieving User's Current Location:

A new locationContext was created to contain all data related to the user location. This meant the actual location, whether the feature is enabled or disabled, and any errors that may have been registered. From here the ControlPanel and MapWidget simply had to implement the desired internal functionality and error handling.

The implementation of the locationUpdater was very straightforward. Querying the user location is natively supported using the react navigator. The only challenge that arose was that the user location was being queried every millisecond. To prevent this, adding a simple time out was sufficient. An additional accuracy check was added to ensure that the user location wasn't being considered if the location estimate was too unreasonable (over 500m).

Map moves to ControlPanel selections:

3 types of interactions were implemented. When searching for a specific station, the map is moved to the specified coordinates, when the user location loads or is manually centered via an interaction button, the map is moved to the specified coordinates, and when an itinerary is selected, the features of the itinerary are retrieved, and the map will move the view so that all features are visible. This was done via the fitToFeatures function, which aims to comply with the following design patterns:

Open-Closed Pattern (OCP): Self-contained function that performs a specific functionality, and is swappable if required (ex. If the map framework is changed).

Adapter Pattern: Feature types represent coordinates in different ways. The function standardizes these into a format that is accepted by the mapLibre fitbounds function.

Testing

Support for the playwright testing platform was added to our CI-Testing job. When npm run test is triggered, both jest tests and playwright tests are executed. Given that playwright tests require the application to be ran separately, an additional step was added to the npm scripts that would run the application before running the tests and shut it down afterwards.

Idle State Performance Test – Implemented with Playwright, aims to ensure that a group of pre-configured context scenarios don't cause unexpected long-running performance issues, such as those caused by memory leaks or infinite recursive loops.

1. Configure desired context scenarios (set values of contexts to desired states).
2. Load page with these new scenarios, which the UI Components should react to.
3. Record memory usage for 3 minutes and ensure that memory growth isn't excessive.

LocationUpdater Test – Ensures that all functionality related to the location updater operates as expected, including updating location when a new location is available and handling low accuracy.

Impediments and plans to address them

Low-Quality icons on Map

At some stage from the process of converting an icon into a bitmap and loading it into the map, the outcome was noticeable low-quality images, as brought up by the LVB PO.

Solution: Issue originates when MapLibre resizes the icons. Leave the icons on their native resolution, and manually resize them to the desired size.

Issues with data source for fitToFeatures

After a layer's data is loaded into the map, the generated features need to be extracted for then using them to determine their coordinates and moving the map to fit them all. When attempting to move to a large itinerary, only a partial section of it was fit into the screen. When attempting to load again a larger section would be fit, and by repeating the whole layer would be visible.

Solution: When using MapLibre's queryRenderedFeatures or querySourceFeatures, only the features in the current viewport (ie. map area). This explains the issue described above. To circumvent it, the geoJSON data used to generate the layer was stored raw, and when the action was triggered, instead of using MapLibre's functions, the raw data was directly submitted to the fitToFeatures function.

Appendix 1: Sample CI-Tests result

```
  2 failed
    testing\playwright\functionality\Map.spec.ts:6:5 › test ─────────────
    testing\playwright\performance\uiContext.spec.ts:33:9 › Performance of app › should
aintain performance during route planning
  20 passed (4.5m)
```

Appendix 2: Sample Execution of Idle Performance Test

```
  ✓ 1 testing\playwright\performance\mainView.spec.ts:13:7 › MainView memory performance - DEFAULT (1.6m)
[DEFAULT] Heap at 10s: 97.36 MB
[DEFAULT] Heap at 20s: 97.37 MB
[DEFAULT] Heap at 30s: 97.37 MB
[DEFAULT] Heap at 40s: 97.37 MB
[DEFAULT] Heap at 50s: 97.38 MB
[DEFAULT] Heap at 60s: 89.97 MB
[DEFAULT] Heap at 70s: 89.79 MB
[DEFAULT] Heap at 80s: 89.79 MB
[DEFAULT] Heap at 90s: 89.80 MB
[DEFAULT] Heap at 100s: 89.80 MB
[DEFAULT] Heap at 110s: 89.80 MB
[DEFAULT] Heap at 120s: 89.80 MB
[DEFAULT] Heap at 130s: 89.81 MB
[DEFAULT] Heap at 140s: 89.81 MB
[DEFAULT] Heap at 150s: 89.81 MB
[DEFAULT] Heap at 160s: 89.81 MB
[DEFAULT] Heap at 170s: 89.81 MB
[DEFAULT] Heap at 180s: 89.82 MB
[DEFAULT] Total Memory Growth: -7.55 MB
  ✓ 2 testing\playwright\performance\mainView.spec.ts:13:7 › MainView memory performance - ITINERARY_VIEW_SCENARIO (1.6m)
[ITINERARY_VIEW_SCENARIO] Heap at 10s: 107.00 MB
[ITINERARY_VIEW_SCENARIO] Heap at 20s: 107.00 MB
[ITINERARY_VIEW_SCENARIO] Heap at 30s: 107.01 MB
[ITINERARY_VIEW_SCENARIO] Heap at 40s: 107.01 MB
[ITINERARY_VIEW_SCENARIO] Heap at 50s: 107.01 MB
[ITINERARY_VIEW_SCENARIO] Heap at 60s: 92.86 MB
[ITINERARY_VIEW_SCENARIO] Heap at 70s: 92.67 MB
[ITINERARY_VIEW_SCENARIO] Heap at 80s: 92.67 MB
[ITINERARY_VIEW_SCENARIO] Heap at 90s: 92.67 MB
[ITINERARY_VIEW_SCENARIO] Heap at 100s: 92.68 MB
[ITINERARY_VIEW_SCENARIO] Heap at 110s: 92.68 MB
[ITINERARY_VIEW_SCENARIO] Heap at 120s: 92.68 MB
[ITINERARY_VIEW_SCENARIO] Heap at 130s: 92.68 MB
[ITINERARY_VIEW_SCENARIO] Heap at 140s: 92.68 MB
[ITINERARY_VIEW_SCENARIO] Heap at 150s: 92.69 MB
[ITINERARY_VIEW_SCENARIO] Heap at 160s: 92.69 MB
[ITINERARY_VIEW_SCENARIO] Heap at 170s: 92.70 MB
[ITINERARY_VIEW_SCENARIO] Heap at 180s: 92.70 MB
[ITINERARY_VIEW_SCENARIO] Total Memory Growth: -14.30 MB
```

Appendix 3: Sprint Requirements

GH Issue #	Title	Description	Size	Reporter	Status
	Distribute Sprint 3 Tasks		S	Jorge	DELIVERED
	Sprint 3 Week 1 with Eva Kessler from LVB	Take notes and distribute further tasks based on comments.	S	Jorge	DELIVERED https://docs.google.com/document/d/1zAt3gsUP_1RVOgr3Itjj5MVTaVywqOuCxpsUtpoXFcM/edit?tab=t.0#heading=h.a3573bavnt3h
#78	Document used Dependencies		S	Jorge	PENDING
	Implement nearbysearch service with conversion test		M	Jorge	DELIVERED
	Convert nearbysearch objects to valid GeoJSONs		M	Marlene	DELIVERED
	Implement nearbysearch layers (prettify with image icons based on type)		M	Marlene	DELIVERED
	Add nearbysearch layers in MapWidget	Only for now only display objects of type stop. Leave other layers prepared. Requires reworking loading-based-on-bounds concept.	L	Jorge	DELIVERED

	Implement logging framework and migrate logs to new formats	To enable logging based on current environment (development, test, or production).	M	Jorge	**PENDING**
	Controlpanel to control currentView when a stop is selected.	Currently done by MapWidget, not desired.	S	**Marcos**	DELIVERED
	Connect currentItinerary to ControlPanel.	Alongside viewmode functionality.	XS	**Marcos**	DELIVERED
	Fix Autocomplete Text Boxes		XS	Jorge	DELIVERED
	Control Panel responds to click on map	Requires content context for source and destination coordinates. ControlPanel must react to external changes to context. - If source && destination coordinates are filled out, search route. Convert coordinates into a location for the content of the textboxes (Done by LeipzigMOVE, APIs don't seem to offer that functionality).	M	Jorge	**NOT IN SCOPE**
	Context for source/destination Input fields	Contains: Displayed text, coordinates / autocompleteObject. Modify ControlPanel for integration.	M	Jorge	**NOT IN SCOPE**

	Reverse Geocoding for map coordinates	Allows user to select from/to on the map. Reverse geocode to get named address of the selected coordinates (requires 3rd party API). Accompanied by modifying autocomplete context's input fields.	M	Jorge	NOT IN SCOPE
	Implement ClearState functionality on DataContexts	Make sure it's threadsafe with useDataFetcher	S	Jorge	PENDING
	Fix window scrolling caused by Layout. – Low Prio	Issue is very obvious on mobile. When accessing lu-lvb-JourneyPlanner/test window scrolling is not present. When accessing normal page though, layout header seems to cause scrolling.	M	Jorge	DELIVERED
	Control Panel 'return' functionality.	Reverts to previous state of window/query/etc. Requires new ControlPanel Context	M	Marlene	DELIVERED

	currentSelectedStop on mapContext is now object instead of just ID	Control Panel needs to parse id to then query stopsMonitor, as it comes in format 'random-test-00000'. ControlPanel to take more advantage of provided object. (Load different controlPanel selectedObject layout based on object type, instead of just "stops".)	S	Jorge	DELIVERED
	"Simulate User Behavior" Test	Final proof that application will work for the user as expected. Simulate the journey of a user through the UI. From searching for stops, to getting the route. From selecting a station on the map, to reading the results.	L	Marlene	PARTIALLY DELIVERED - Doesn't verify map reactions
	New SearchStation ControlPanel Component View	Lets user write a stop name and opens up the StationDetails view	M	Marcos	DELIVERED
	Add labels to Haltestelle nearbySearch map layer		XS	Jorge	DELIVERED
	Correct Icon Sizes	Standardize all to 256x256 Resize on map	XS	Jorge	DELIVERED
	Improve/prettify existing layers	Intermediate Stops, Itinerary Lines, etc...	S	Marlene	DELIVERED

	Zoom button +/- connected to MapWidget		M	Jorge	DELIVERED
	Find and import new more functional style into MapWidget.		M	Marlene	PENDING

... Sprint 3 Week 1 UI/UX Improvements based on comments from Eva ...

https://docs.google.com/document/d/1zAt3gsUP_1RVOgr3ltjj5MVTaVywqOuCxpsUtpoXFcM/edit?usp=sharing

	Routes and Itineraries controlpanel pages display more information	Based LeipzigMOVE concept changes provided by Eva. Includes: Display more information (delays, etc) Routes & Itinerary stop times to include delay (Wants special sorting, but might be out of scope) Distance to location	M	Marcos	PARTIALLY DELIVERED - Distance to Location missing

	Improve Translations		XS	**Marlene**	DELIVERED
	Use colors in itinerary legs to display on ControlPanel and map instead of hardcoded colors	not possible. otp API doesn't provide itinerary leg colors in objects	S	**Marlene**	DELIVERED
	Fix Switch origin and destination button overlapping with route input fields.		S	**Marcos**	DELIVERED
	Get user current location		S	**Jorge**	DELIVERED
	Display current user location on map	Auto-center on user location on start-up. Center-button to move back to the current location.	M	**Jorge**	DELIVERED
	Allow user to select current location as source/destination		M	**Marcos**	DELIVERED
	Sprint 3 Week 2 with Eva Kessler from LVB	Take notes and distribute further tasks based on comments.	S	**Jorge**	PENDING https://docs.google.com/document/d/1_fmk-u1X-nSdifnqcUVKxh2EHgiJ0eUSl9SXCWsQUsM/edit?tab=t.0#heading=h.a3573bavnt3h

... Sprint 3 Week 2 UI/UX Improvements based on comments from Eva ...

https://docs.google.com/document/d/1_fmk-u1X-nSdifnqcUVKxh2EHgiJ0eUSl9SXCWsQUsM/edit?usp=sharing

	Review notes from Sprint 3 Week 2 with Eva Kessler from LVB	Review Notes	XS	**Marlene**	**DELIVERED** https://docs.google.com/document/d/1_fmk-u1X-nSdifnqcUVKxh2EHgiJ0eUSl9SXCWsQUsM/edit?tab=t.0#heading=h.a3573bavnt3h
	Comments from David	In Email "Software Design Studio"	S	**Jorge**	**DELIVERED**
	Stylistic changes to ControlPanel components	Based on feedback from LVB	M	**Marcos**	**DELIVERED**
	Use Itinerary Leg and Stop colors from LVB API's on ControlPanel	Instead of the currently hard-coded approach	S	**Marcos**	**DELIVERED**
	Use Itinerary Leg and Stop colors from LVB API's on Map	Instead of the currently hard-coded approach	S	**Marlene**	**DELIVERED**
	Improve translations		S	**Marlene**	**DELIVERED**
	Visual improvements to Map Interaction buttons		S	**Marlene**	**DELIVERED**
	Fade-in Map Layers when loaded in	Currently they just spawn into existance. Makes experience smoother for user.	S	**Jorge**	**DELIVERED**

	Improve MainView for use in Mobile Devices (or devices with low resolution)	- Hideable controlPanel overlay. - ControlPanel interactions disabled when hidden. - ControlPanel can be hidden/unhidden by drag or by click interaction. - Add visible state to a context so other components can trigger custom interactions.	M	**Jorge**	DELIVERED
	Map reacts to selection in SearchStation view	Set the ControlPanel to hidden, move Map view to the selected stop, Set ControlPanel to Visible	S	**Jorge**	DELIVERED
	Map reacts to itinerary selection by ControlPanel	When an itinerary is selected, show the whole itinerary path on the user's view.	M	**Jorge**	DELIVERED
	Map Icons need to be sharper	Currently look blurry. Issue is caused when MapLibre resizes icons. Change native resolution and display that instead.	S	**Jorge**	DELIVERED
	Fix Layout overlap issues	Only occurs on pages with NavBar. Container size set to 100% doesn't take into account existing NavBar, causing it to go outside the user's window resolution.	S	**Jorge**	DELIVERED

	Memory Leak / Infinite Loop Detection Test	Take advantage of Context architecture. Create scenarios based on contexs, which should be reacted on by underlying components, and monitor idle performance.	M	**Jorge**	**DELIVERED**
	Test LocationUpdater to ensure functionality and that expected errors occur.		S	**Jorge**	**DELIVERED**