





How to Read

This supplementary appendix will provide a focus on Rosenthaler Platz data.

Every section will be dedicated to one temporal phenomenon: public transportation trips frequency, accessibility to Rosenthaler Platz during the day and commercial activities time schedules.

At the end of each section one part will be dedicated to the project prototype, interaction flow for the specific exploratory view and a detailed description (with screens) of the functionalities will help you understand the general purpose of the project, even without seeing the entire prototype.

Trips Frequency pg. 4

Connections pg. 9

PT - Interaction flow pg. 13

Hours and Popularity pg. 19

Specific Patterns pg. 22

CA - Interaction flow pg. 26

Trips Frequency

Weekly Frequency

As one of the central districts of Berlin, Mitte is also core to transport connections, it is enough to mention the presence of the central city train station and Alexanderplatz U-bahn and S-bahn hub to understand how important it is in terms of mobility for the city itself.

Rosenthaler Platz is no exception, quickly becoming a key position (also historically: the intersection was a point of access in the Berlin wall, connecting West and East Germany during the Cold War) few tram lines, one underground line (U8) and several day and night time buses stop at every corner of the area.

Especially the presence of the U8 makes Rosenthaler Platz an important point of interchange for commuters. However, a closer look to data unveils that also road means of transportation are playing a fundamental role, connecting a widespread of districts.

U-bahn 8 is the highest frequency mean of transportation, during its peak it can reach 25 rides per hour. At night it is replaced by a bus - N8 - that guarantees the service on a slightly limited route. Trams are the second means of transportation, M1 in particular, covering the north and south area of the district. The main frequency variations can be observed during the weekend, when only buses man-

tain their frequency.

Trams

 M1  M8

M1 and M8 are the two tram lines covering Rosenthaler Platz area.

M1 runs 24 hours, included the weekends, while M8 stops for the first three hours of the night.

The two tram lines are effectively connecting the East districts of Berlin to Rosenthaler Platz, as we will see later this has an high impact on the area accessibility.

Each line has two stops for the two opposite directions, both of them positioned on the East side of the street.

U-Bahn

 U8

U8 is cutting Rosenthaler Platz from North to South. Even if trams have long routes and flexible schedules, U8 is still considered the most important connection in the area, since its speed and its precise schedule makes it highly reliable for commuters.

During the week U8 closes at night, while on the weekend trisp are guaranteed all night

1. PUBLIC TRANSPORTS

long. Multiple entrances make U8 accessible from each point of Rosenthaler Platz, allowing commuters to quickly move between U-bahn, trams and buses.

Buses

- 142
- N40
- N8

Three lines cross Rosenthaler Platz. However only 142 is running during daytime. N8 is substituting U8 at night, whi-

le 142 itself is substituted by N40. Night lines follow the same routes as their daily counterparts, however they are reduced from time to time, based on the commuters affluence. Generally commuters do not enjoy traveling by bus at night.

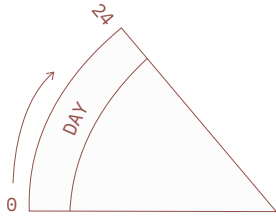
"I really hate to take the night line in-

stead of the U-bahn when it's closed at night. I feel it's less safe and slower. I don't know if it makes extra stops, but it takes forever to be back home."

— Berlin inhabitant, interviewed on May 2019



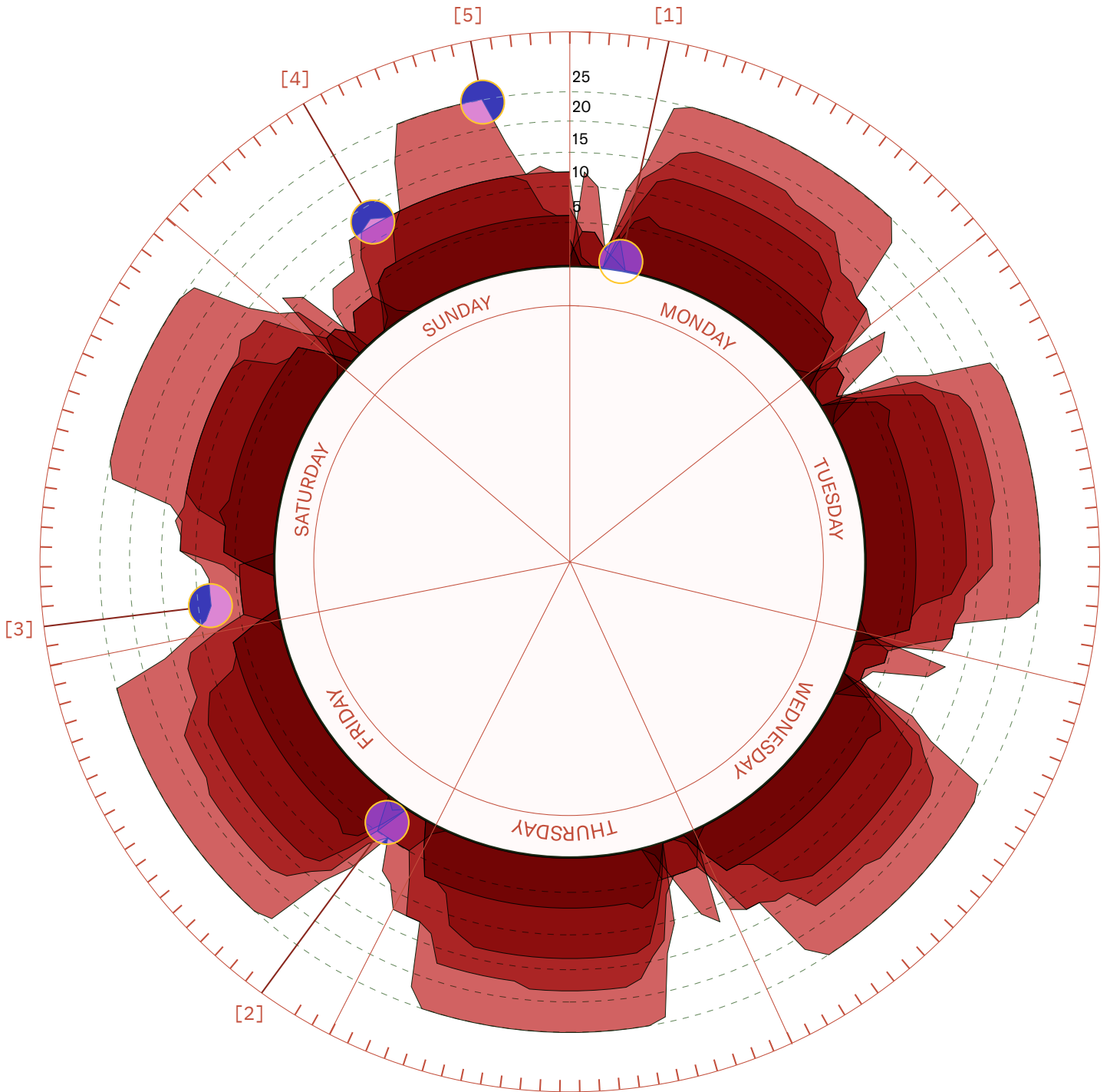
1. PUBLIC TRANSPORTS



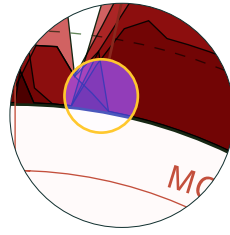
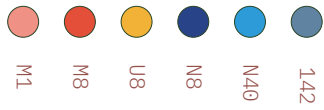
opacity = number of active lines



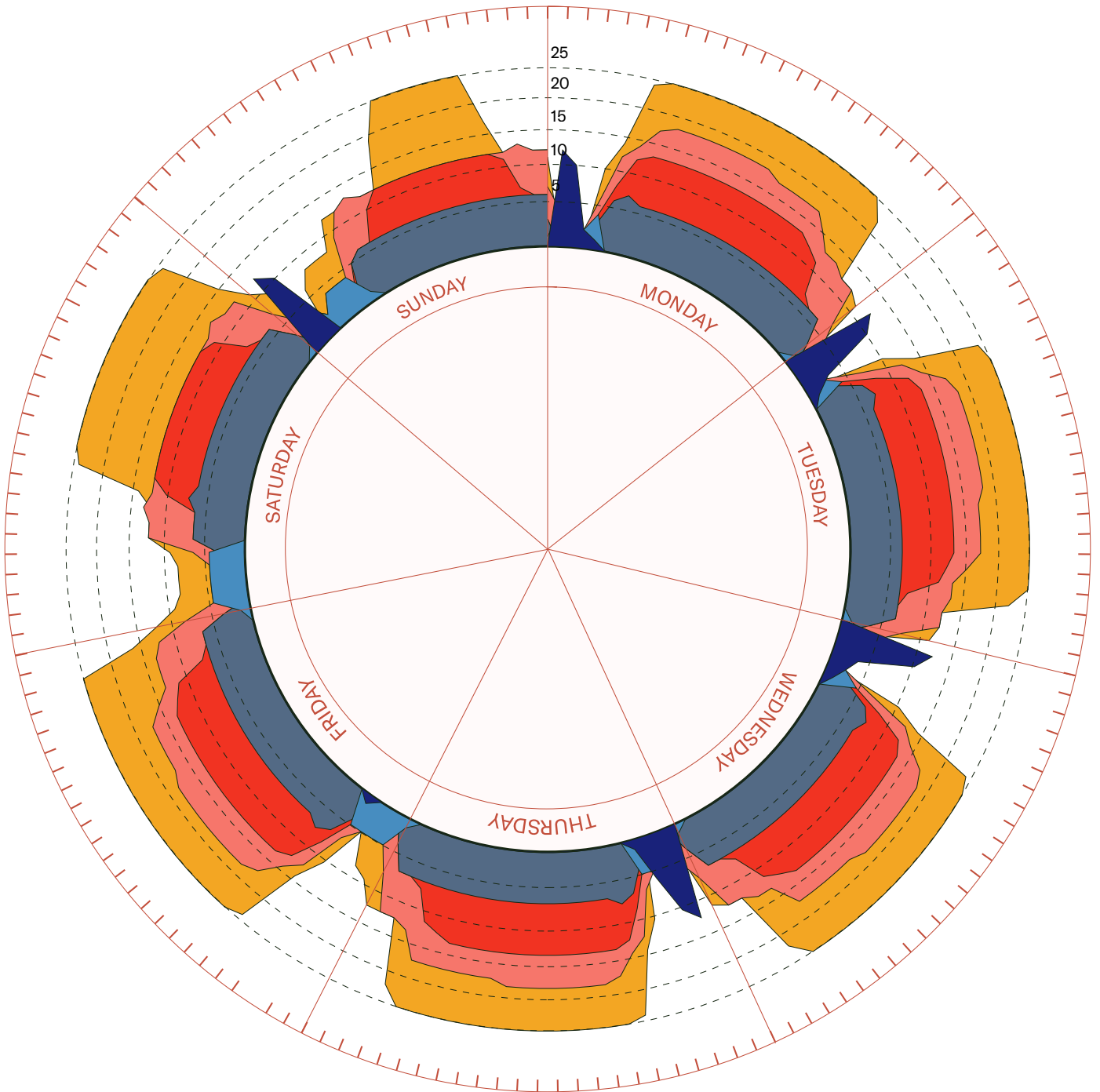
height = number of ride in 1 hour

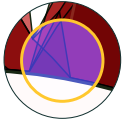


1. PUBLIC TRANSPORTS

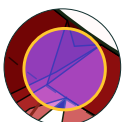


Comment on data, see next page



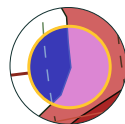


[1] Interestingly, the only moments in the day when all the lines are active is very early in the morning and very late at night. There is one hour where the night lines are still running together with the first ride of the daytime lines. It is evident how high the quality of transport is in this area: virtually the 24 hours are always covered - if we do not discuss the accessibility topic.

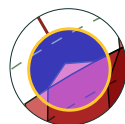


[2] On Thursday night the U-bahn runs all night. The N8 bus rides are, in fact, not happening. As we will see later this coincide also with the more popular evenings of Rosenthaler Platz. Bars and restau-

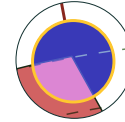
rant will be crowded for the next two days, both on Friday and Saturday evening.



[3] The night between Friday and Saturday has the most active night time in terms of transportation. U-Bahn ride frequency is even higher than on Saturday night, when the N8 starts running again and rides are decreasing.



[4] M1 curious one hour frequency peak on Sunday might indicate the importance for tourists visiting the area. However is really peculiar that it is happening for just one hour in the morning.



[5] U-bahn rides are shrinking on Sunday. The frequency is lower before 13 and 18, the central hours of the day where much of the shops are open and other places in the city are active as well.

Connections

Better connections to and from east Berlin

The history of the place plays still an important role in how some sources are distributed. Transport connections themselves are a good example. Rosenthaler Platz is located precisely at the former border between West and East Berlin. When the wall was demolished, transport connections were restored, but the development of tram lines in the East did not happen in the West part, leading to an unbalanced distribution of transports, at least in this area. East districts are, therefore, more frequently connected, with a widespread of stops and tram lines. Connections to west districts happen mainly through the U8 line and buses, however all the south-west part of Berlin has no direct connections to Rosenthaler Platz (this is not extend to Mitte in general, that is central to the Berlin transports and interchange network).

Night service has a limited geographical range

Starting from one of the more possibly problematic dimensions, night connections, it appears clear how Rosenthaler Platz is almost always accessible during night times.

On weekdays there are night bus lines (N8 and N42) and the M1 tram line, while on weekends even the U8 stays open, covering what are usually defined “dead hours”, from 3 to 5.

However, even if convenient in terms of offer, the night service in Rosenthaler Platz has a way reduced range in terms of geographic extension. Mitte, Pankow and Friedrichshain are the three main connected districts at night, while others are more difficult to reach or in some cases (as it is for Lichtenberg and Marzhan - Hellensdorf, they are almost completely cut out.

This implies than during the weekdays the night time mobility is restricted to the districts nearby, shrinking the possibility to reach (in a reduced amount of time) outskirts and outern districts.

During the weekend the situation is generally better, U8 connection allow to reach Neukolln and Reinickendorf in shorter times. This schedule distribution may be cause or consequence to the high number of places dedicated to weekend entertainment, anyway

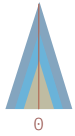
Rosenthaler Platz is a hot spot for the night life, also thanks to favourable connections through the U8.

U8 still perceived as the most important connection

Even if in terms of pure geographical connections the U-bahn line is somehow the most limited in terms of connected locations - if we draw a comparison between the extension of the tram and bus routes in this specific area of the city, it is clear how surface means of transportation are more widespread - users still perceive it as the most efficient and important.

This is due to the direct connections with other important transport hubs in the city and with the higher overall frequencies of rides that are not influenced by traffic problems. Interviewees are evaluating U-bahn lines as more reliable and important than others, trams are following being a fast and widespread means of transportation, buses on the other hand are often considered as less accessible and tend to be avoided if necessary.

Single Hour/Day: 672



Aggr. Week: 13598

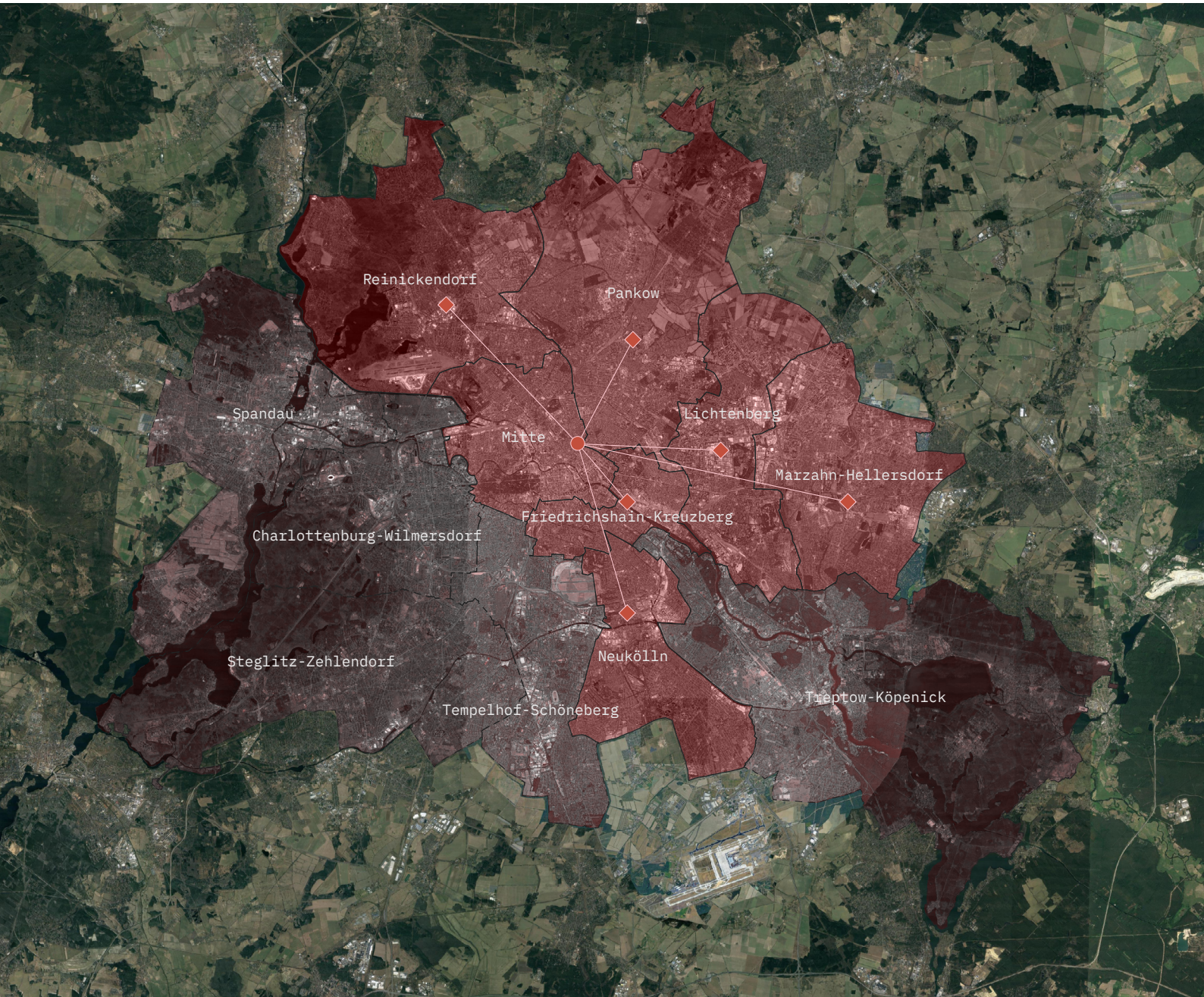
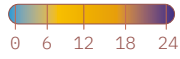


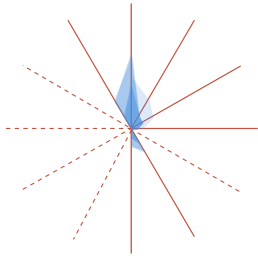
Opacity can signal a recurrent frequency for districts

line styles =

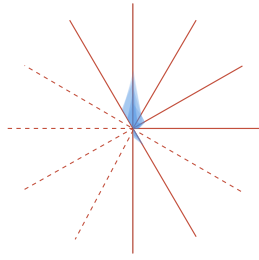
- this district is directly connected
- this district is not directly connected

color = moment of the day

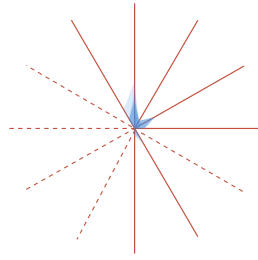




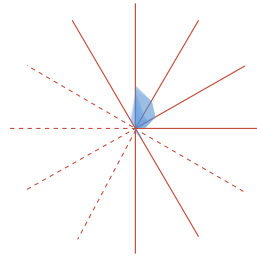
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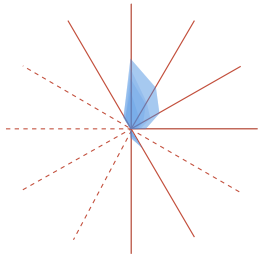
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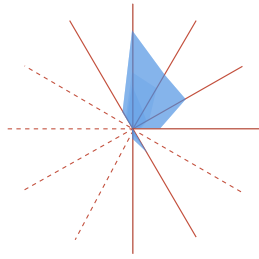
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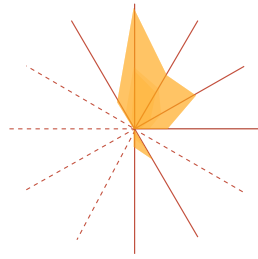
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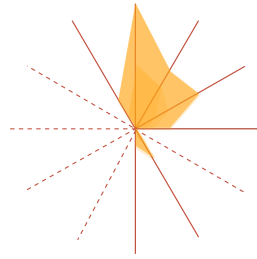
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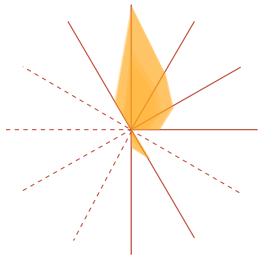
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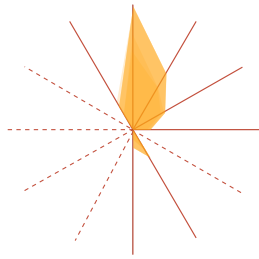
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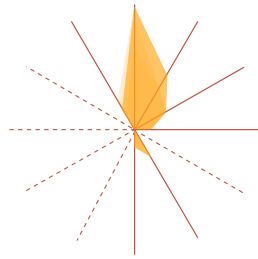
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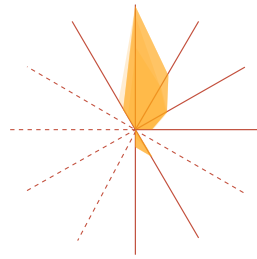
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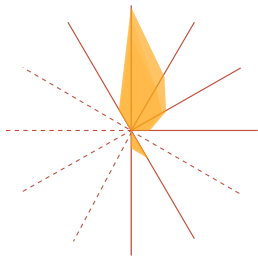
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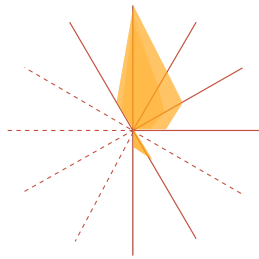
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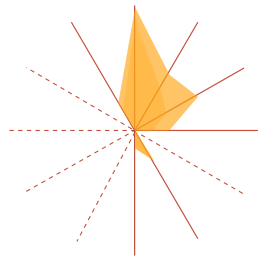
11 - 12



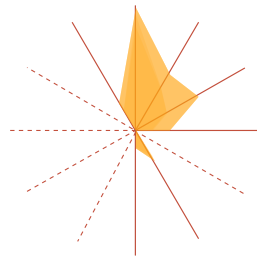
12 - 13



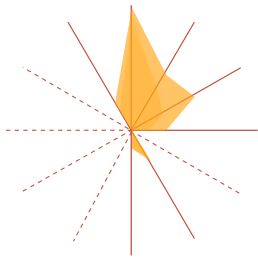
13 - 14



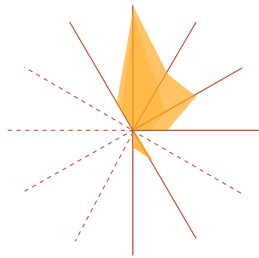
14 - 15



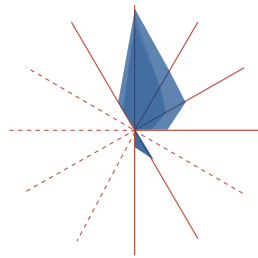
15 - 16



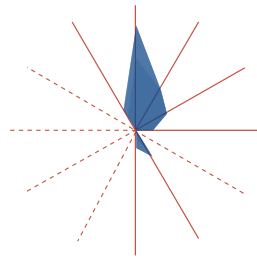
16 - 17



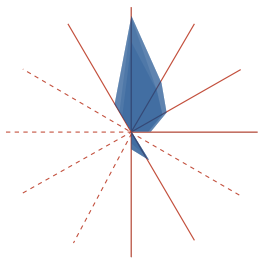
17 - 18



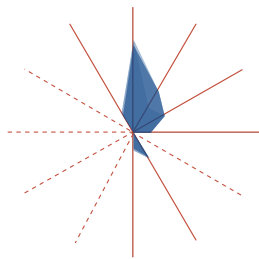
18 - 19



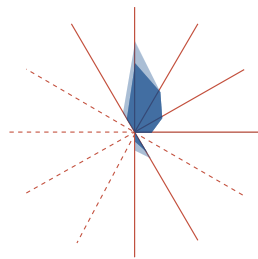
19 - 20



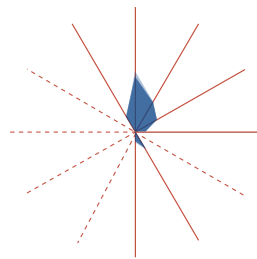
20 - 21



21 - 22



22 - 23



23 - 24

Interaction Flow and Visual Models

In terms of structure, Public Transports have the first chapter dedicated. The chapter itself is divided into two distinct sections: the first one considers means of transportation absolute frequency, the second one is disaggregating single districts and hours to provide more specific views to the reader.

This sequence of topics has been developed to help the reader focus on a more general temporal pattern on the first view.

For the first view, a circular line chart has been chosen [1], time is developed on a circular axis to help the user in reading the weekly pattern without visual jumps [2]. Contextual data are displayed as annotations [3] and - in some specific cases, after selecting specific comments - corrections [4].

The second view is characterised by small radar charts [5]. Each chart is representing one specific point in time - that can be aggregated, such as one week, [6] or disaggregated, such as one specific hour of the day [7] - the axis are the districts of Berlin, arranged according to their geographic position. Representing time through small multiples allows me to aggregate and disaggre-

gate data for the user, to make differences between single points in time visible and directly comparable. This is specifically useful to represent granular time patterns with very small differences [8] in terms of variation and a stable oscillation.

The interaction flow is perfectly circular for both exploratory view: users would be able to enter a visualization, explore it further by using the menus provided and then exit it by scrolling through at any given point, without being forced to go back to previous screens. As we will see below, this flow is not always possible. Here the interaction is facilitated by having simple filters apply to data, therefore there are no big logical jump between views (as it will be the case for commercial activities).

Datasets and data sources:

SCRAPED

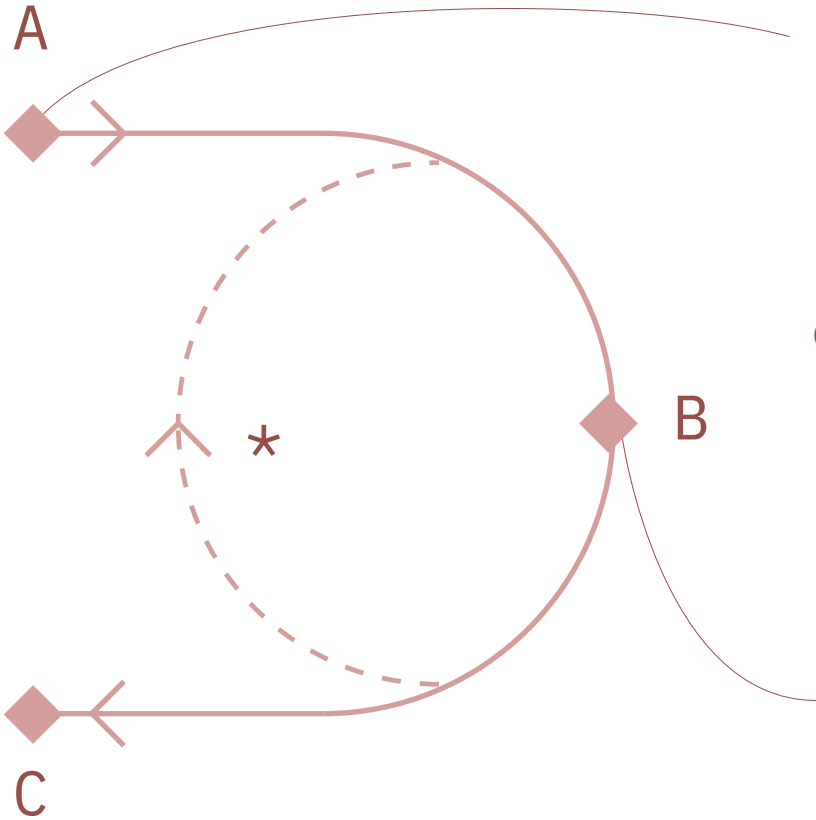
- Static GTFS data from BVG
- Real time GTFS data from VVB

COLLECTED

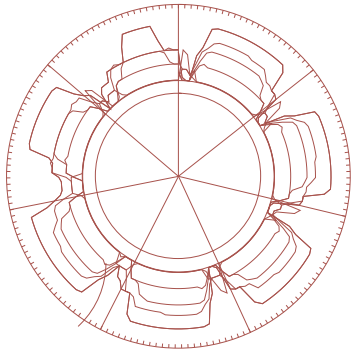
- Exploration notes

Used techniques:

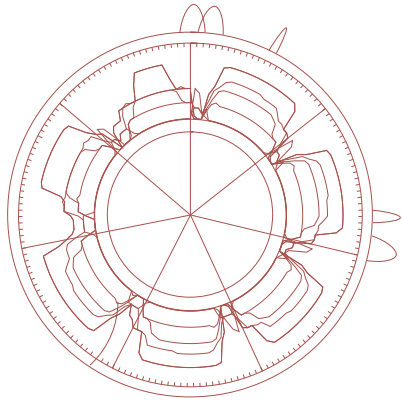
- Annotating
- Redrawing
- Highlighting
- Guiding



Frequency circular line chart

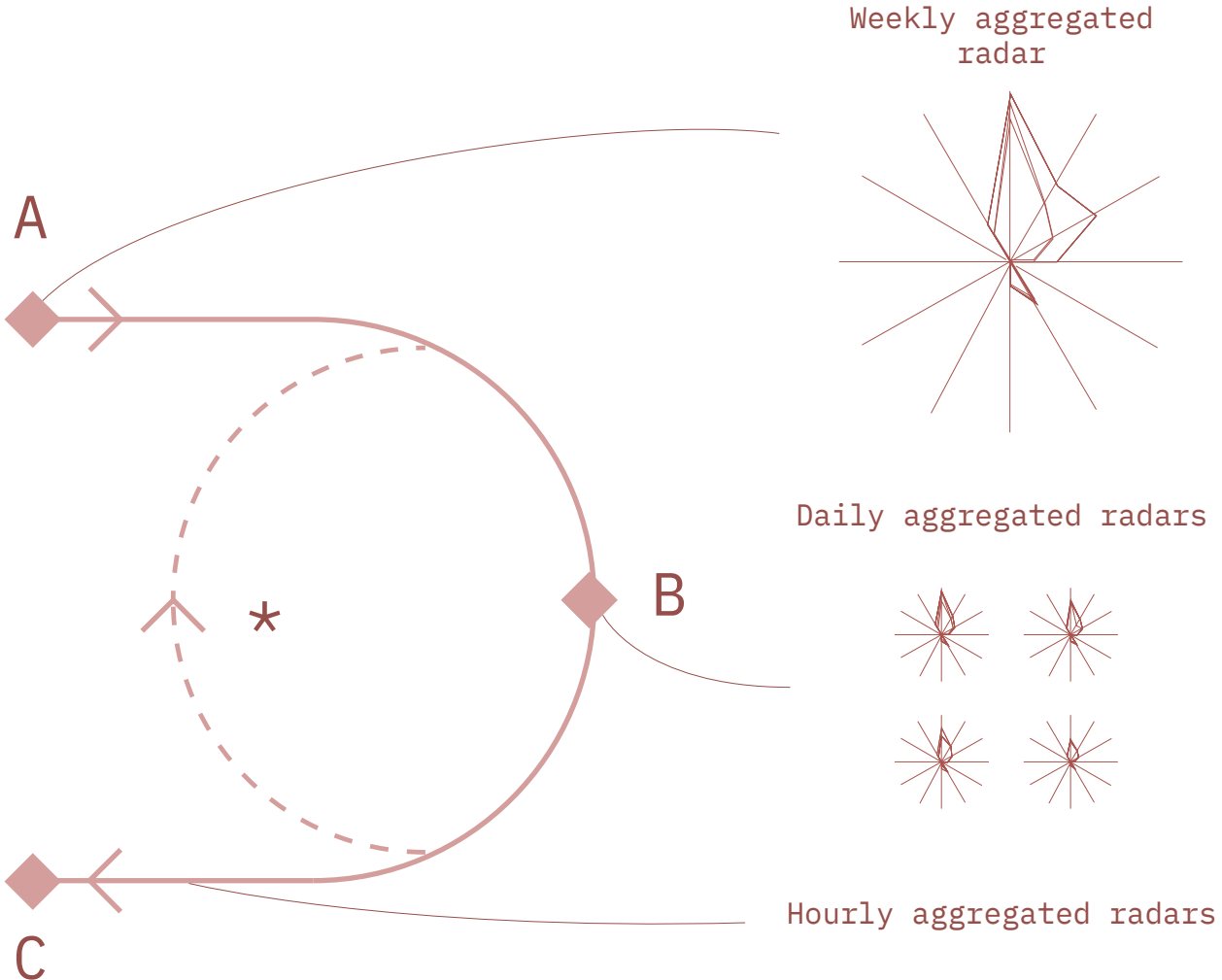


Context and distribution are added

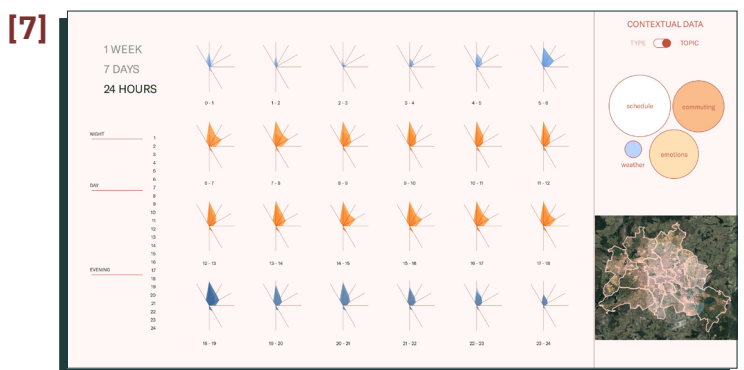
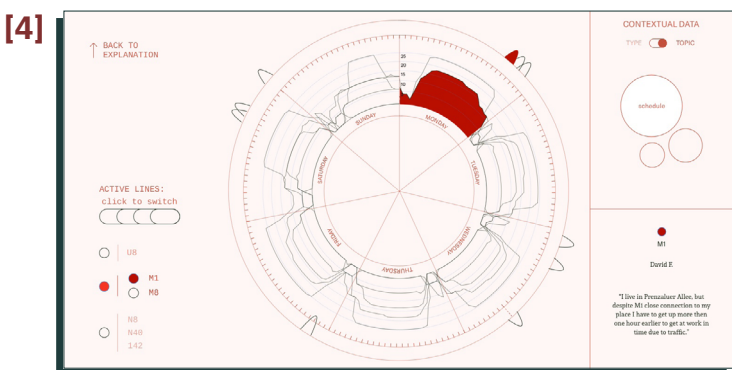
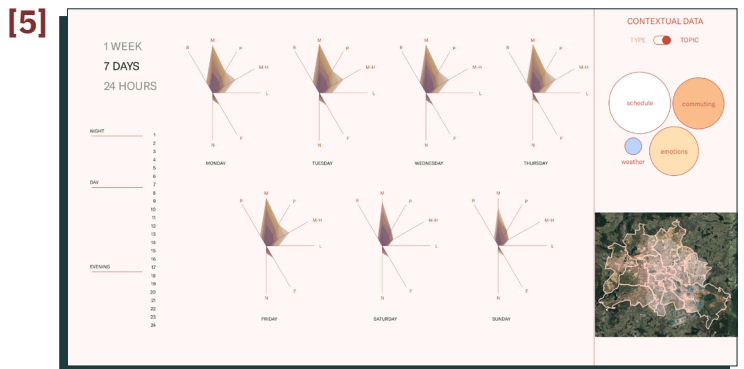
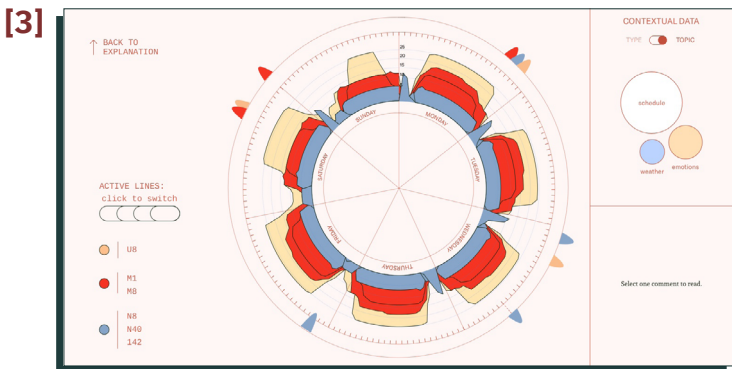
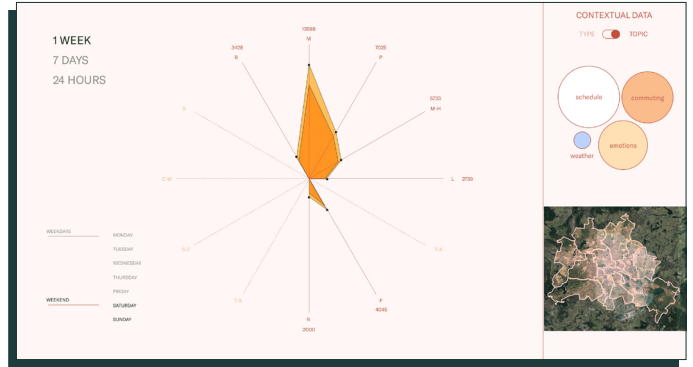
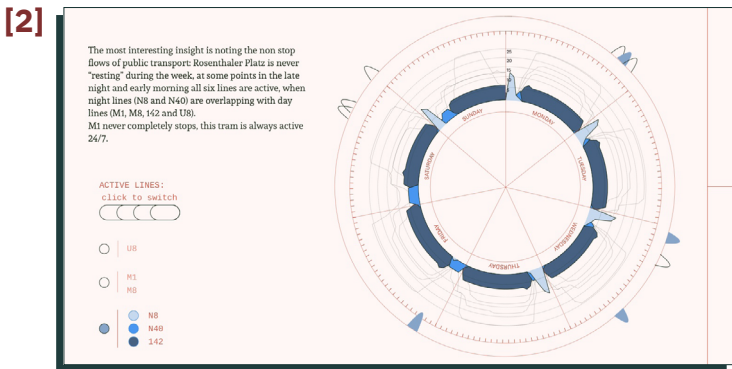
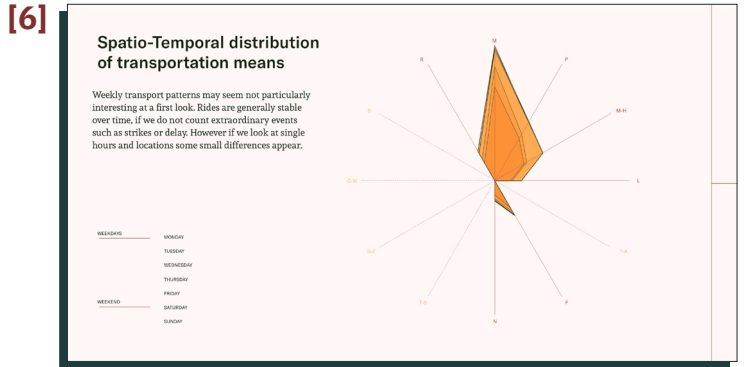
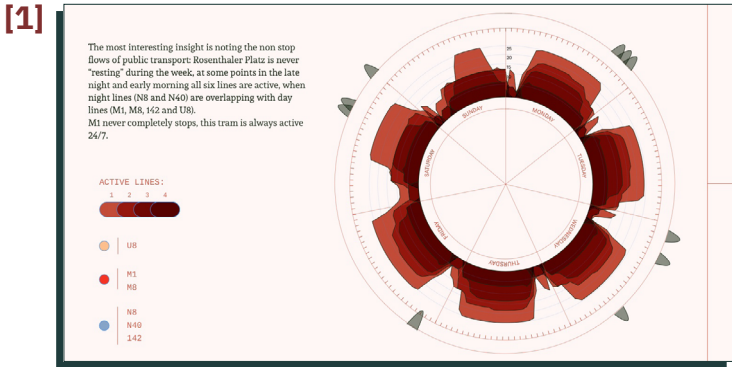


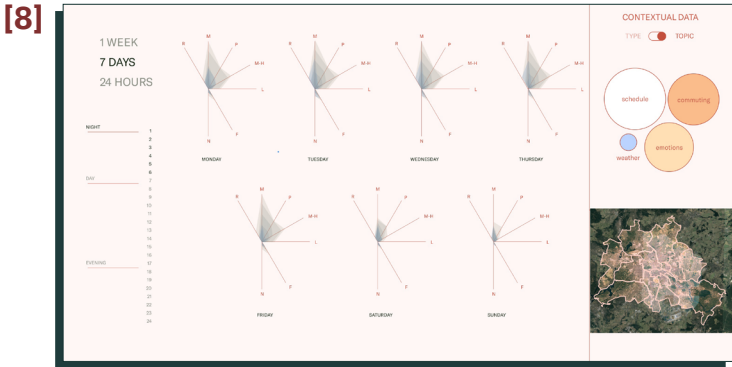
* All the layers of the graph can be toggled without going back or forth in the narrative. By scrolling the reader decides to proceed.

- Annotating
- Highlighting
- Redrawing



Highlighting
Guiding





Screens are arranged according to the interaction flow, but numbered based on when they are referenced in the text at page 15.

2. COMMERCIAL ACTIVITIES

1 pallino rappresenta 1 ora della giornata:

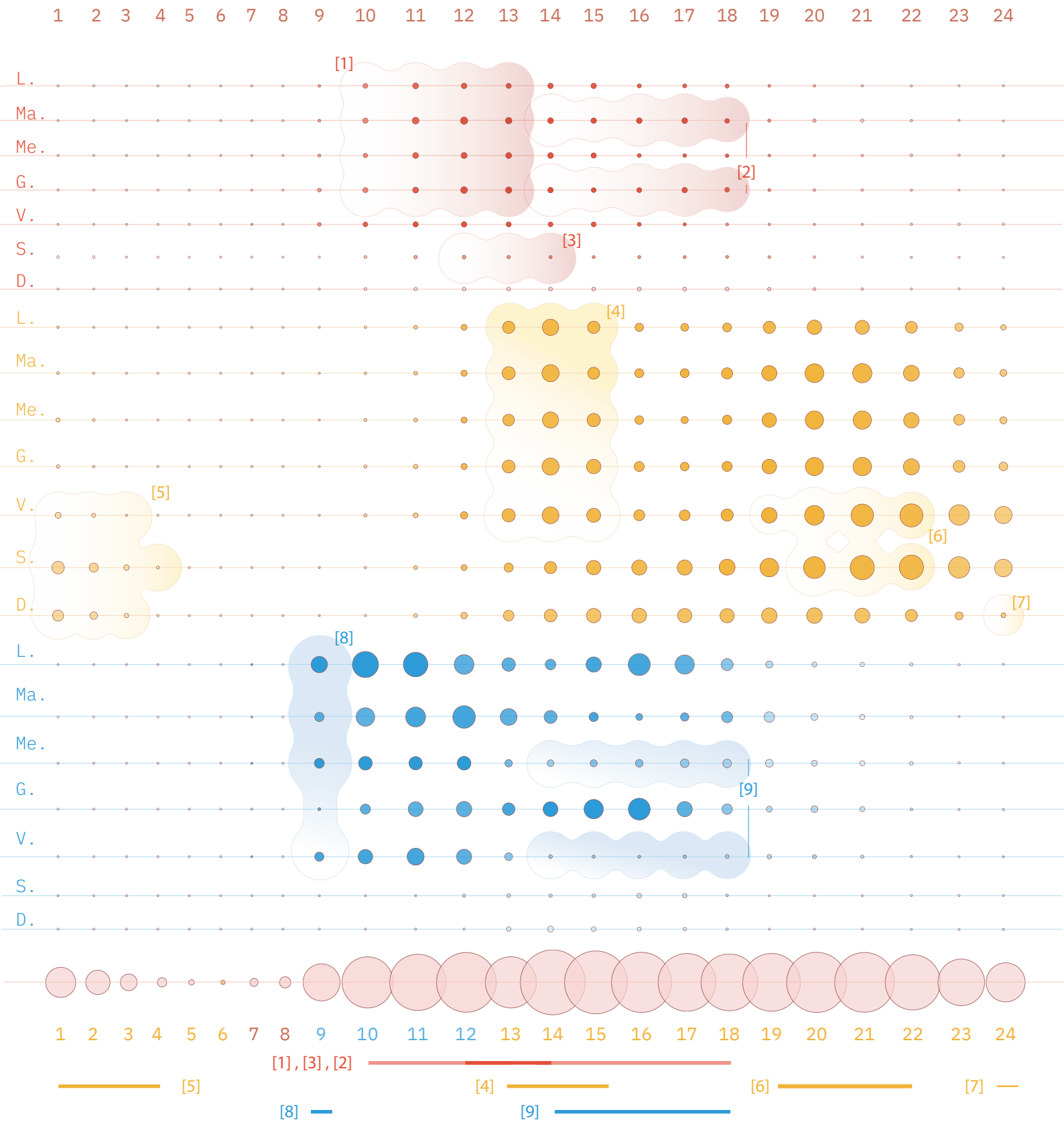
colore = categoria di riferimento



dimensione = % di popolarità



opacità = % di attività aperte



Hours and Popularity

Berlin official reports on Mitte defines the area as an important commercial and tourist attractions in the city [Mitte Bezirkprofil, 2016]. Being recognized as the centre of Berlin, public and governmental institutions are present, together with tourist facilities and recreational activities. Rosenthaler specifically, is mentioned for its own small fashion and design shops that attract a younger population throughout the 24 hours.

By looking at time schedules for activities in the area I was able to generate a series of insights, some of them are confirming the official report statements, some

others are revealing further aspects that could be interesting.

—

SERVICES

[1] Popularity peaks for services are distributed mainly during the morning, until 13. This trend is clearly bounded to the working week: the presence of various offices strongly influences the percentage of open and popular places.

[2] Tuesday and Thursday are the afternoon opening days for bank and community services for citizens. The inflexible schedules of these activities make Rosenthaler Platz perception as a place with small community reinforcement and accessibility points.

[3] On the weekends offices are closed, the small percentage of services that remain open are shops dedicated to design and fashion. Their attractiveness remains low in average, however a positive trend can be seen in the summer period (probably due to the higher tourists volume)

“I would never live in Rosenthaler, it’s too crowded and touristy. I like to come here at night, but it’s a non-place in some sense. I’d prefer live northern in the district, it feels more local.”

— Berlin Mitte inhabitant interviewed in Berlin on 16/06

As previously observed, the area is characterized by a high presence of restaurants, bars and night venues. The most popular moments are lunch breaks during the working week and evenings on the weekends.

However the popularity of this category is definitely high all day long, confirming the importance of these activities not just in terms of numbers, but also as the more attractive for area users.

FOOD AND ENTERTAINMENT

[4] The week lunch breaks are the moments where the flow of clients is higher. The highest popularity peak matches breaks for services

“On friday and saturday we close at 3, sometimes we let clients stay inside until 4:30, it’s the longest shift you can get.”

— Membro dello staff, Zur Rose, intervistata 21/02

and offices around. However the afternoon is quite popular as well, probably due to tourism and in general for the important position in the city of Rosenthaler Platz.

[5] Nights between Thursday, Friday and Saturday are another important moment of convergence. Many venues remain open until late at night, attracting people.

[6] However, the highest popularity peak is the Saturday night dinner time span. Another signal of how the general share of activities are bounded to entertainment moments. The quality of transport links to the area create a very good condition to access easily Rosenthaler Platz at night. Connections from and to similar districts (such as Pankow and Neukolln) make it easier for people to move smoothly.

[7] On Sunday, even if an afternoon trend is visible and high, the evening is the return to the “status quo”. At midnight the flow of clients drastically shrink to zero.

The last category we are going to analyze is services dedicated to healthcare and personal wellness. I considered part of this category both healthcare services, both fitness venues. Even if the category could fit inside the more general “Services” category, the overall number of activities in this group - almost 12% of the entire dataset - was

asking for a dedicated category that could be explored more easily.

HEALTH

[8] The opening hours for healthcare structures are very reduced. The first hours in the morning are the most popular ones, especially Monday morning.

[9] Tuesday and Thursday doctor offices are most of the times closed and the flow of client is even more reduced. The unbalance in the opening hours make the access to these places particularly difficult. Few places (apart from fitness and selfcare venues) are opened on evenings and weekends.

Specific Patterns

Food Patterns

If we take a close look at food places we can spot three different sub-categories and behaviors.

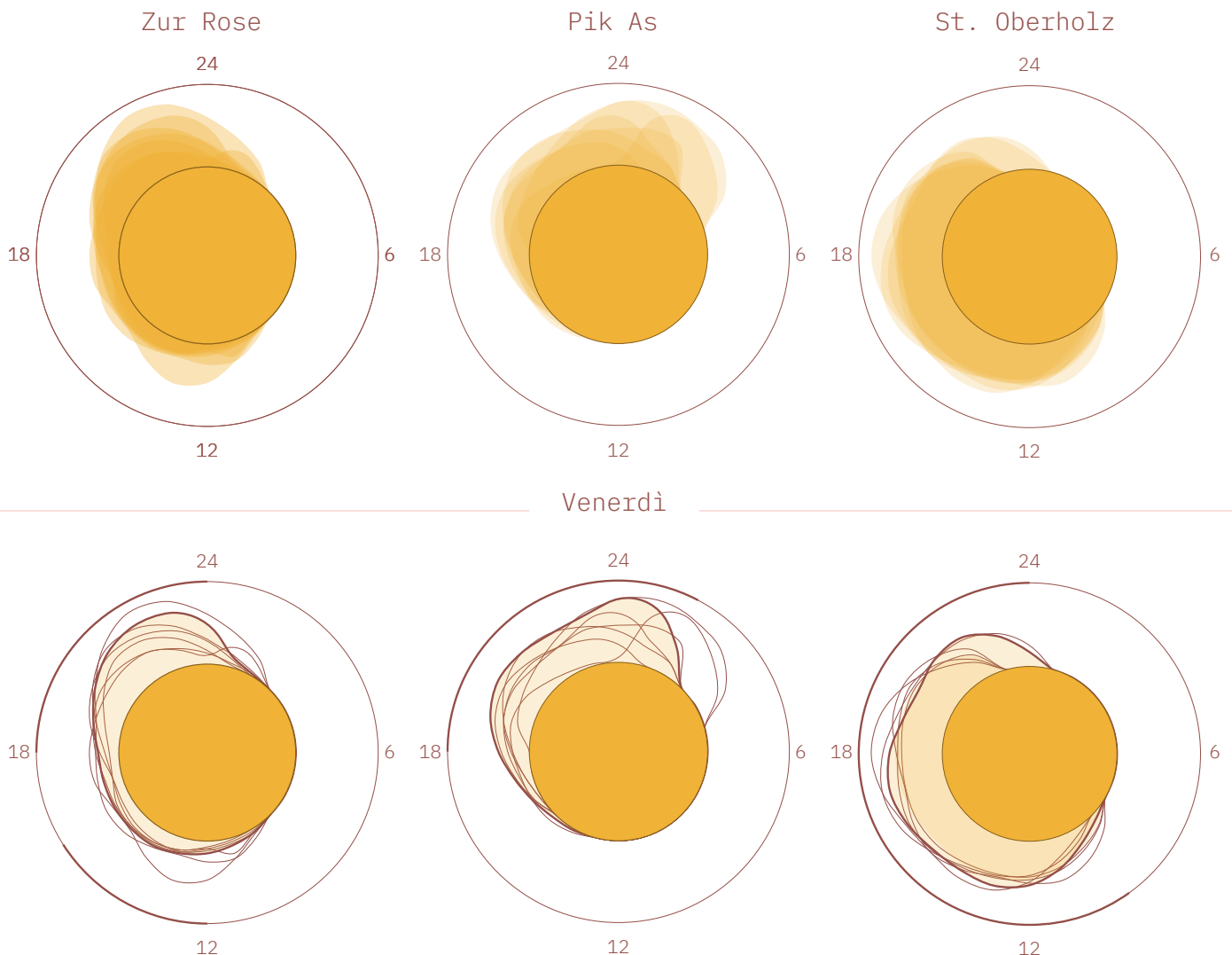
I selected three commercial activities

that could help me illustrate differences in patterns.

The first business selected is Zur Rose, a restaurant that also serves as an evening beer place, the second one is Pik As, a small pub situated in the south part of the intersection, here only drinks, beer and

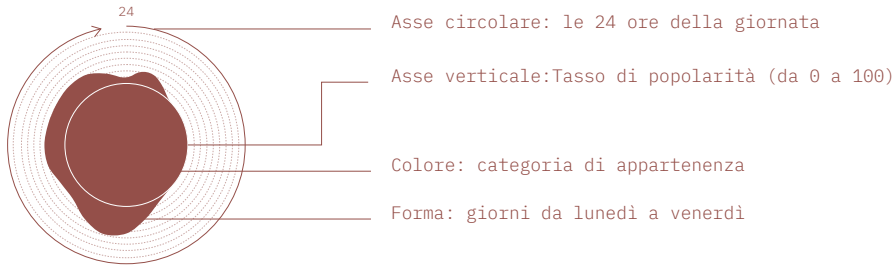
beverages can be purchased, it is not possible to have food. The third location displayed is St. Oberholz, a day time bar and co-working with a small selection of drinks for the evening.

If we look at the three glyphs it is possible to notice that popularity peaks are distributed differently based



2. COMMERCIAL ACTIVITIES

Un glifo rappresenta un'attività commerciale durante la settimana:



on the place offer. The presence of clients variates enormously based on that, both in the daily frame (the second row of the visualization is showing data for Friday) and the weekly period (in the first row it is possible to see all the days stacked on top of each other)

Who is always open?

Some activities are open 24/7, for example small supermarkets known with the name of "Spatkauf". Rosenthaler Platz counts five of them, almost one for every street corner. These small supermarkets are often attended by young people during night hours to buy cheap beers or cigarettes.

However the more interesting commercial activities that remain open 24 hours are not

part of this sub category.

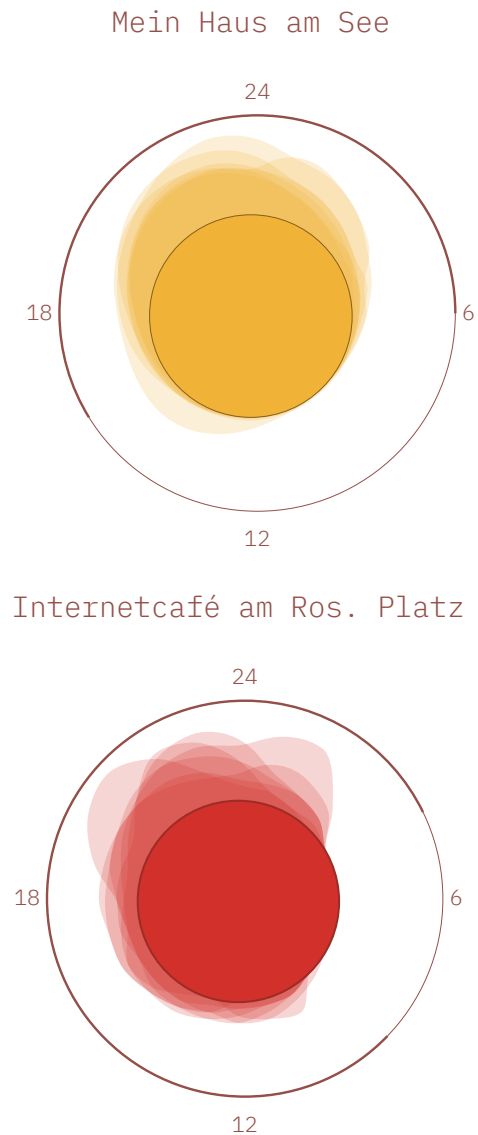
The first place is a venue - Mein Haus am See - with an area dedicated to clubbing. Mein Haus am See is very peculiar because is open 24/7 no stop. Popularity peaks exist (especially at night), but they are much more distributed along the 24 hours.

popularity of services like public laundry, a center to assist women and families, one job center and a financial consultant center.

The second place investigated belongs to the service category. It is an Internet Café that offers international phone calls at very low prices for its clients. If we look at the temporal distribution it is almost impossible to spot single popularity peaks. The flexible hours of this activity make this place attended almost at every moment of the day (except for the central hours of the night and the early morning).

More services?

The existence of a service like this Internet Café can foster a new observation: it is not possible to label this area just as a touristic and commercial hotspot, inhabitants are present and they already see this area as an important point for their activities, as it is testified also from the presence and



Using the official Berlin reports - where is openly recognized the weakness of the services in this area - and the considerations on the visualized data, my observation can be paired up with the official one in the report:

The offer of services could be implemented further to make the life of residents better and

make them feel more cohesive with the neighborhood. This would help closing the existing gap between North and South Mitte.

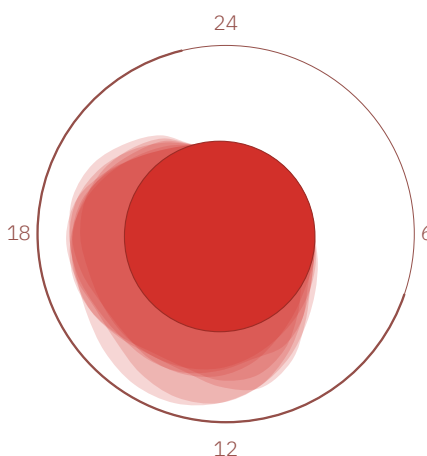
Health and Self care

A smaller number of places dedicated to a more aesthetic self care are present in the

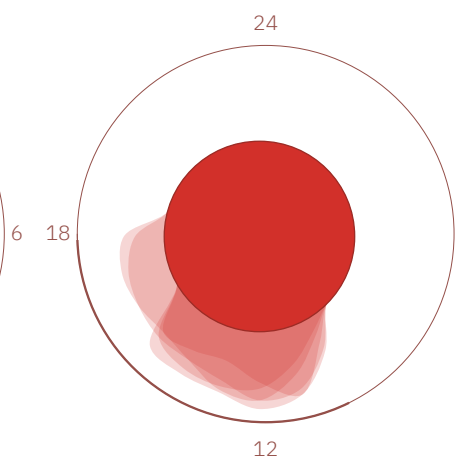
area as well, the more interesting example is Fit Am Rosenthaler a small gym situated on the third floor of a building in Torstraße, that provide workout machines along with physiotherapeutic ones, becoming half health and half self care centered.

Health related facilities tend to be really crowded during the first hours of the morning and in the late afternoon just before 18. They attract a large share of users, that

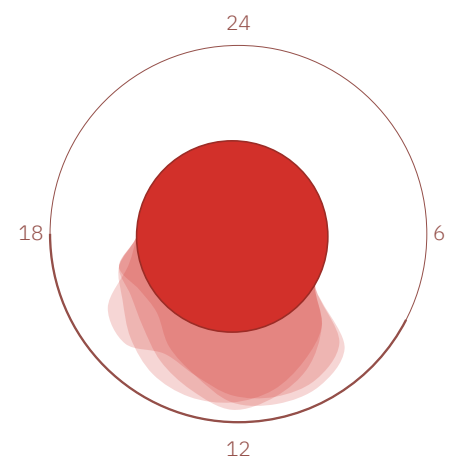
Waschsalon 115 GmbH



Berl. Sparkasse -
PrivatkundenCenter



Hänsel Zeitarbeit



concentrate in the friendliest hours for workers.

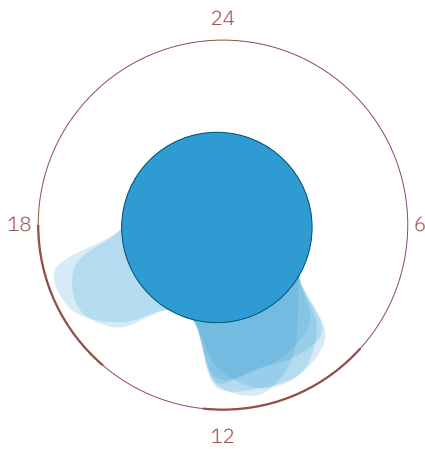
To explore the health category I selected four venues. Three doctors and one gym, this is clearly showing how different are those places in terms of

hourly schedules. While the rigid time schedule for doctors and specialists hinders a continuous flow of users, selfcare places have a more flexible amount of popularity peaks during the week.

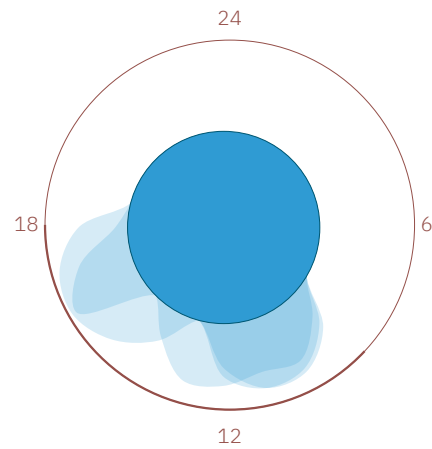
A more workers friendly time schedules could help

distribute better access to the facilities and diminish the crowded hours. In fact, those places look always really crowded and inaccessible, long queuing time are needed. It is interesting to note how healthcare facilities always follow the same patterns in terms of schedules and popularity.

Augenarztpraxis at Ros. Platz

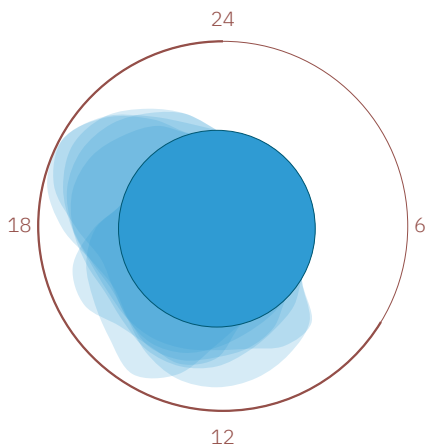


Dr. med. Thomas Rößner

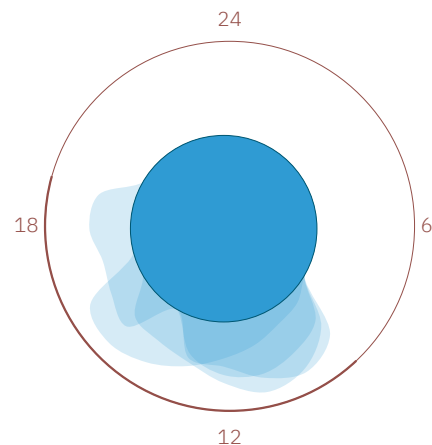


Selfcare

Fit am Rosenthaler Platz



Jasmin Malak



Interaction Flow and Visual Models

In terms of visual representation of activities schedules I decided to create one unique explorable view for the user. Three main arrangement of the data are possible. Activities are in most cases treated as single entities in the representation **[1][2]**, only in one view they can be aggregated according to their main category to show the weekly opening/close and popularity pattern. **[3]** As the user aggregates the shops, it won't be possible to select single dots, but highlights on the main visualisation grid will fade in to display contextual data on a general weekly level. **[4]** Single dots can be observed from a distance, together with other shops and activities (this is helpful to display their similarity score, geographic position and, as mentioned for the aggregated view, temporality pattern) or, as previously mentioned, they can be zoomed and observed independently with their specific features (popularity data, open and close times, interviews comments and observations). Personal and contextual data are entirely visible only when one single activity is accessed **[5]**, this further interaction step is provided to avoid

overwhelming visual features on the other visualisations. However, on general views users will be provided with graphical hints of personal data existing for the location they are looking at. **[6]**

On this view contextual data are provided to create links between schedules belonging to different activities and to contextualise specific peaks and behaviours. It is vital for the users, in order to help them understand how time interacts with the environment, to have more information than just "official" data.

Time is visualised both on a linear axis (when activities are aggregated according to their category) and on a radial grid (when the shops are presented in their specificity). The linear axis allows for a more easy reading operation when multiple dots are visualised and create space for highlighting chunks of meaningful data. The circular representation is useful for single activities, since it allows to overlap all the days in a week and spot similarity in data. It also creates a smooth interaction flow by creating space for annotations on context directly on top of a specific hour.

Datasets and data sources:

SCRAPED

- Popularity data from Google myBusiness
- Opening and Closing hours from Yelp!
- Commercial activities index from OSM

COLLECTED

- Manual index of commercial activities
- Interviews on popularity
- Interviews on clients activities

Used techniques:

- Annotating
- Redrawing
- Highlighting

Annotating

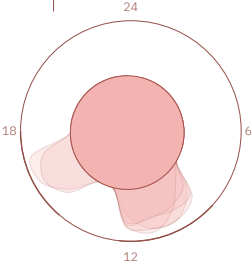
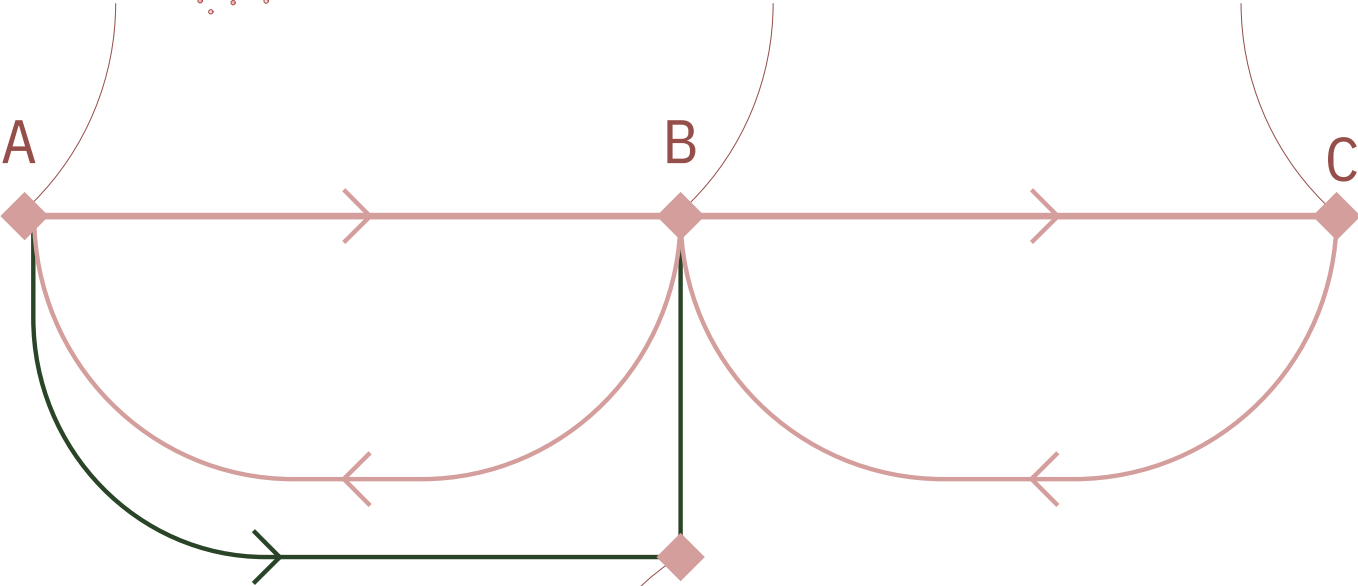
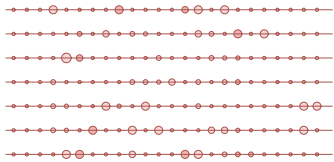
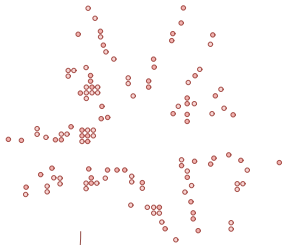
Annotating

Redrawing
Highlighting

Geo Grid

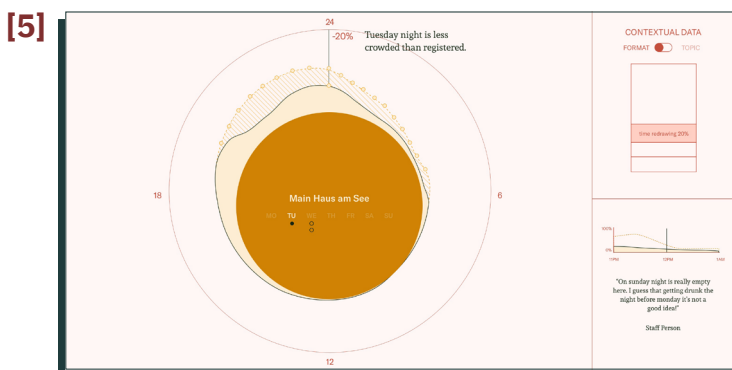
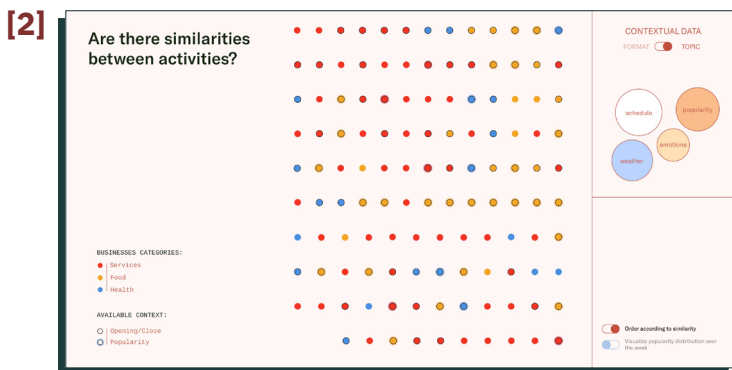
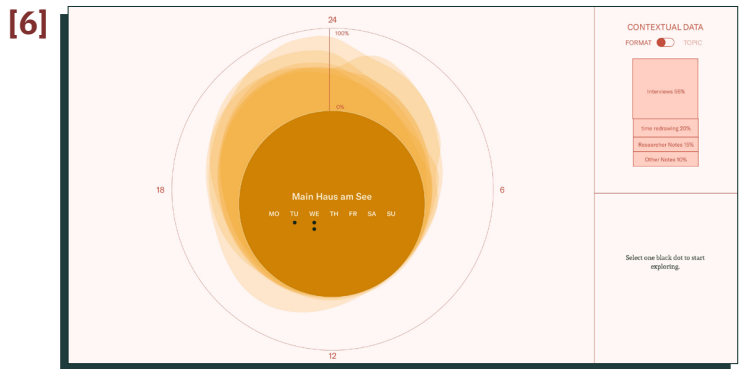
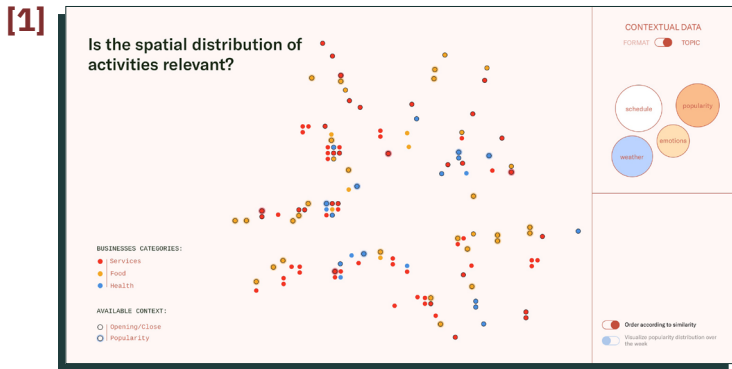
Similarity Grid

Popularity Aggr.



Time Flower

Redrawing



Screens are arranged according to the interaction flow, but numbered based on when they are referenced in the text at page 15.

