

1 Sentence

Public transport user struggles with knowing where their bus is when running late.

Aspects

- Tech
 - Enablers
 - GPS Connection
 - Cheap and performance dense computers (useful for mobile tracking)
 - Constraints
 - Geographical features
 - Tunnels
 - Mountains
 - GPS Dead spots
 - Concrete buildings
- Ethics
 - Data Privacy & Safety
 - GPS tracking of buses and users locations must ensure that no personally identifiable information is exposed or misused.
 - Users should know what data is collected, how it is stored, and who has access.
 - Real-time tracking information should not create safety risks, e.g., encouraging passengers to run for buses in unsafe conditions.
 - Equity of Access
 - The app should serve all users fairly, including those without high-end devices or continuous mobile data.
- Design
 - Onboarding
 - Integration with suedtirolmobil when selecting a connection or line
 - Experience cues
 - Map shows public transport positions
 - Filter by
 - line number
 - arrival time
 - kind (bus, train, etc.)

State of the art

This issue used to be taken care of by the 'SASA Bus App', which has sadly been discontinued since then.

Gap

Geographical features may make continuous tracking challenging. Covering larger areas with more public transport requires large amounts of infrastructure (trackers), as well as possibly posing difficulties making the app usable with many lines and connections.

Opportunity

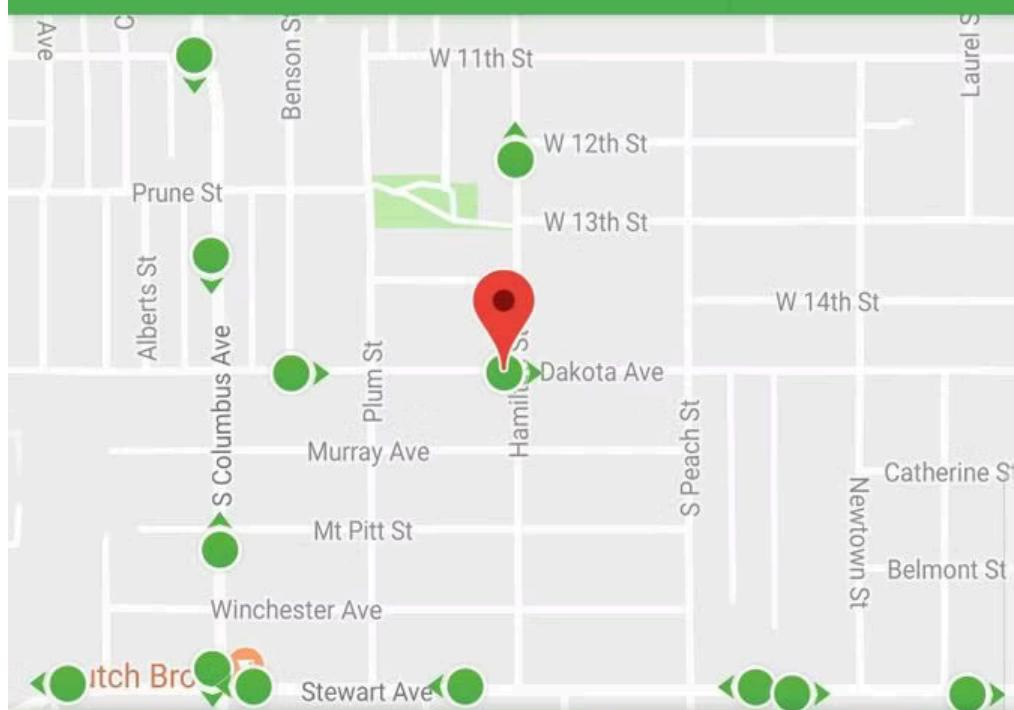
We believe that by creating a good way of tracking public transport for its users, we can improve the overall travelling experience.

11:26

87%



Nearby



★ 2 West Medford

11 min

★ 2 West Medford

41 min

★ Dakota Ave - West of Hamilton St (E) ↗ ^

★ 2 West Medford

Scheduled

11 min

Arriving at 11:37 AM

★ 2 West Medford

Scheduled

41 min

Arriving at 12:07 PM

LOAD MORE ARRIVALS



Public Transport Tracking

An HCI Project by Hell Bjoern Felix, Soini Samuel,
Lazarov Andrej
Group 6





Problem

- Users have no idea where their public transport is / if it is on time
- Planning journeys or alternative connections is difficult without knowledge about delays



Existing Solution

- Static timetables give an indication of when transport is supposed to arrive
- No real time updates
- Announcements on train stations for train delays
- Examples
 - London TfL (Transport for London)
 - OneBusAway
 - MtA Bus Time (New York)



User / Customer Segment

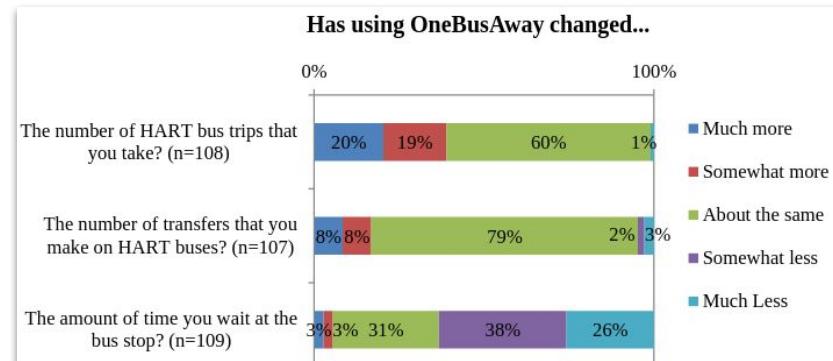
- Users
 - The average Joe trying to use public transport
 - The general public
- Customers
 - Public transport providers
 - Private transport companies



Data & Statistics - OneBusAway

- OneBusAway

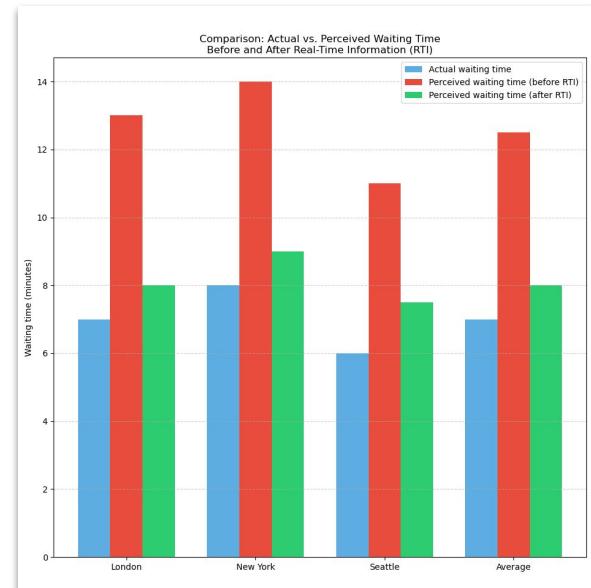
- In New York City, real-time information led to an increase in weekday ridership of 1.7%, with the biggest increase on routes with the greatest level of transit service.
- In Seattle, 92% of riders reported increased or greatly increased satisfaction with public transportation.
- Riders self-report an increased number of transit trips per week, particularly in the off-peak when transit is below capacity.
- For riders without real-time information, perceived wait time is greater than measured wait time. But, having real-time information brings perceived wait time in line with actual wait time.
- Mobile real-time information users have been observed to actually wait almost 2 minutes less per trip than those arriving using traditional schedule information.





Data & Statistics - TfL and MtA Bus Time

- Perceived waiting time decreases: Real-time displays reduce the subjective perception of waiting time even if the objective waiting time remains the same — this improves satisfaction and the feeling of safety. (Empirical findings from several studies).
- TfL findings
 - Perceived wait times dropped by about 30-40%
- MtA Bus Time (New York)
 - Perceived wait times dropped by about 25%
 - Passengers report less stress and frustration



Thank you for your attention

Any Questions?

Public Transport Tracking

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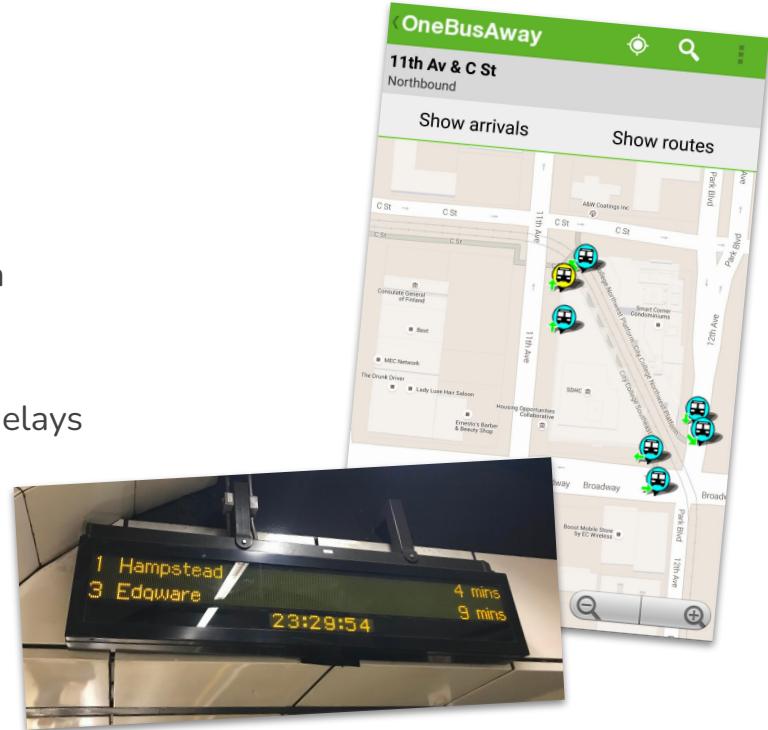
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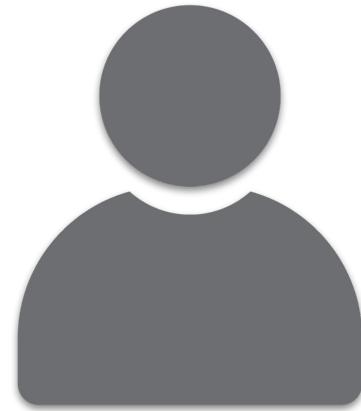
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Interviews - Public transport users Summary

Key statements:

- Difficult planning / alternative finding
- Unannounced delays are unpredictable
- Estimated waiting times make wait feel shorter

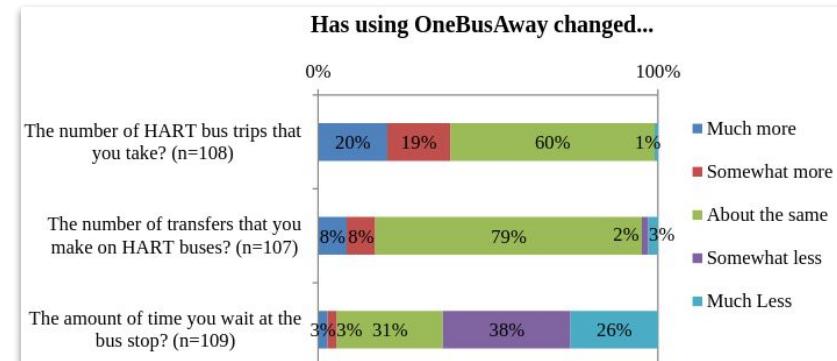




Data & Statistics - OneBusAway

- OneBusAway

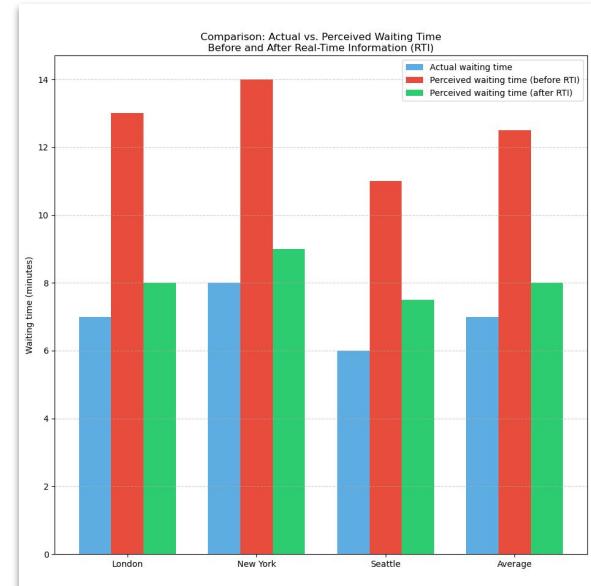
- NYC: real-time information led to an increase in weekday ridership of 1.7%.
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- Riders self-report an increased number of transit trips per week
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- Real-time information users have been observed to actually wait almost 2 minutes less





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Assignment - Human Centered Design

Goal of our research

The aim is to collect user data in order to determine whether the ability to track public transport is a necessary feature or one that offers a real benefit to users.

The target group for our research is most public transport users. However, we do expect them to have some basic knowledge of how to operate digital devices like smartphones, in order to make use of our application.

Choose methods

The best way to achieve our goal is to collect personal data and thus create a sample. Accordingly, we decided to conduct a survey coupled with online research.

- Survey
 - Get a picture of the current situation passengers deal with
 - Evaluate whether there is even a need for our project
- Online research
 - Fetch data in regards to similar projects, their viability and how useful they have been to passengers

Participants

Participants will be chosen out of a random pool consisting of:

- students which rely heavily on public transport
- randomly chosen peers, known to also take advantage of public transport

This should give use a decent overview of different groups of people

Preparation

- Google Form: <https://forms.gle/5jdYbNLm1B7ezA1i8>
- Online research
 - Data from similar Projects
 - TfL
 - Live arrival times
 - Service alerts
 - Journey updates for London's transport network
 - Apps, signs, and open data feeds
 - OneBusAway
 - Standalone Mobile and web app
 - Real-time transit arrival information
 - Service alerts for participating transit agencies
 - MtA Bus Time
 - Real-time bus locations
 - Predicted arrival times

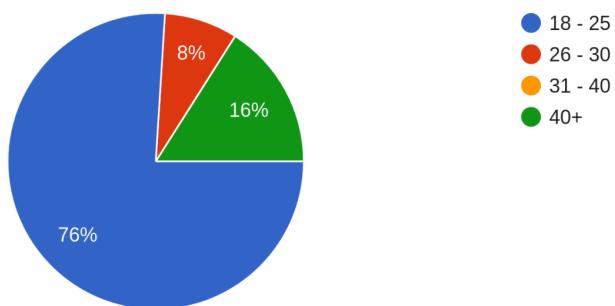
- Service alerts for New York City buses via web, SMS, apps, and open data

Execution

The survey has been sent into the UNI class chat, as well as being shared with friends and relatives. This produced somewhat predictable results which summarized indicate a strong interest in the concept of supplying passengers with real time information.

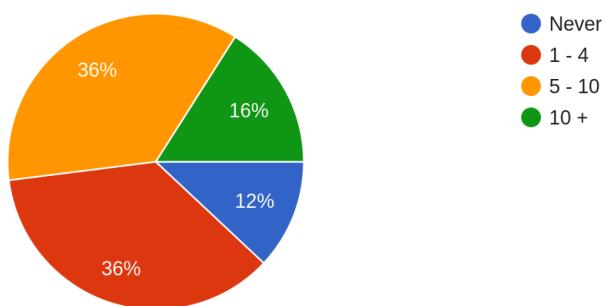
How old are you?

25 responses



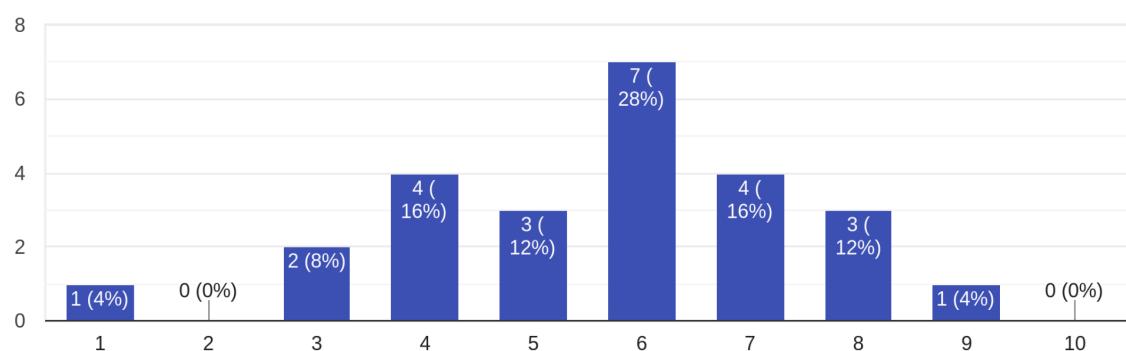
How often do you use public transport each week?

25 responses



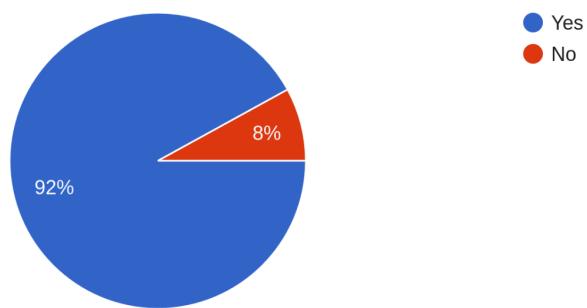
How would you rate the punctuality of local public transport?

25 responses



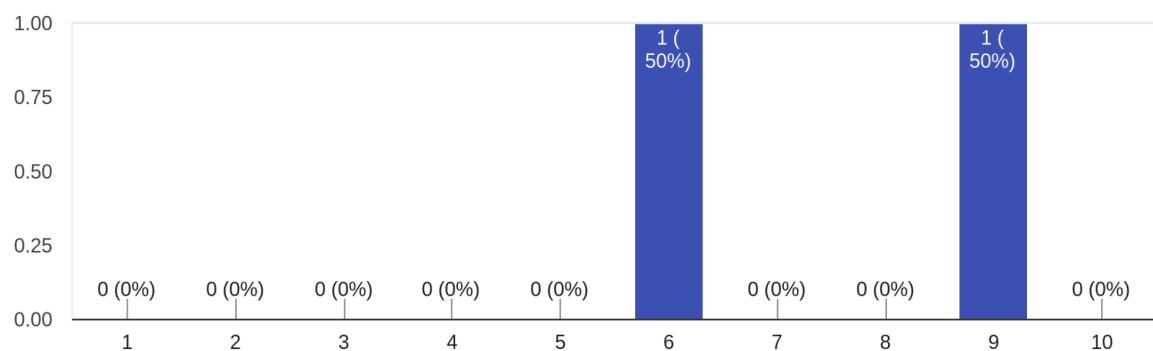
Do you use the 'südtirolmobil' app?

25 responses



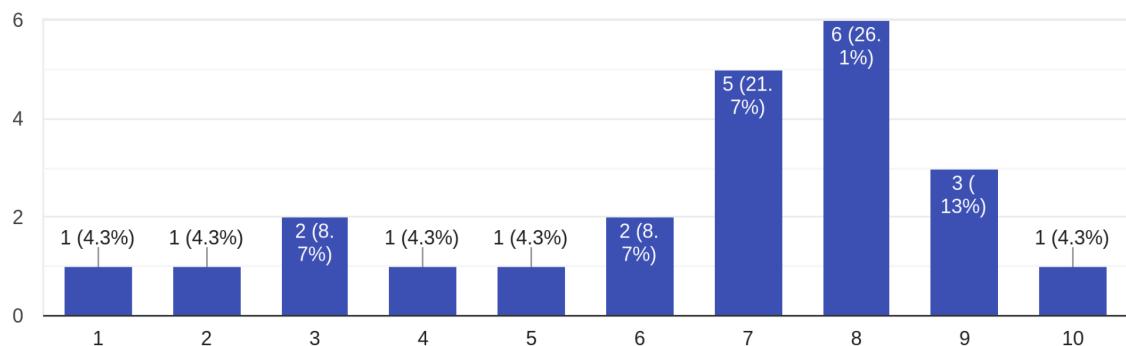
How satisfactory/adequate is the information provided by the timetables for you?

2 responses



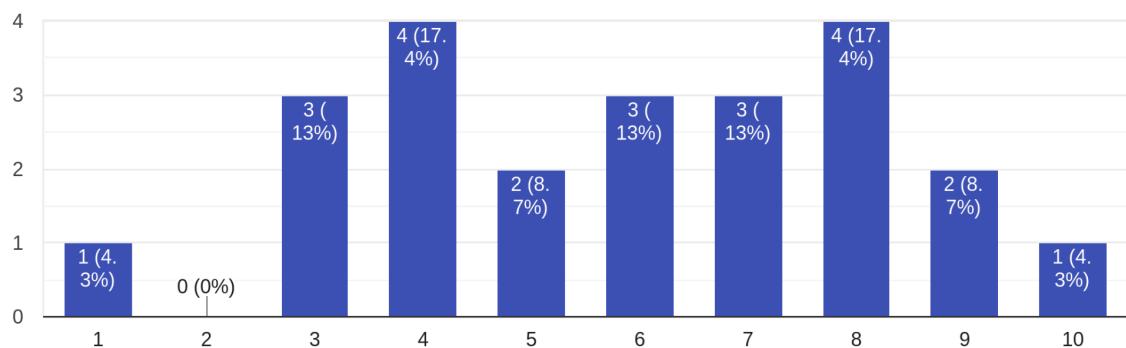
How satisfied are you with the app (in general)?

23 responses



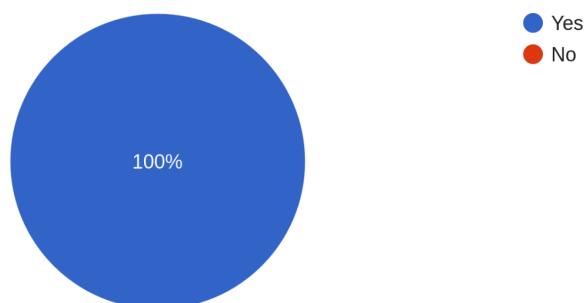
How satisfied are you with the app's punctuality display?

23 responses



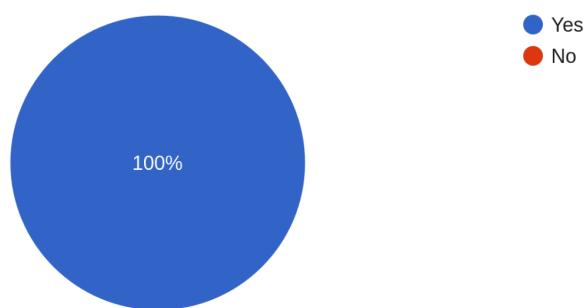
Would real-time information improve the experience (vehicle location, utilisation, etc.)?

25 responses



Would you use such an app? (Tracking example)

25 responses



For the online research we consulted data from similar projects like MtA and TfL, which led to interesting statistical findings

Analysis



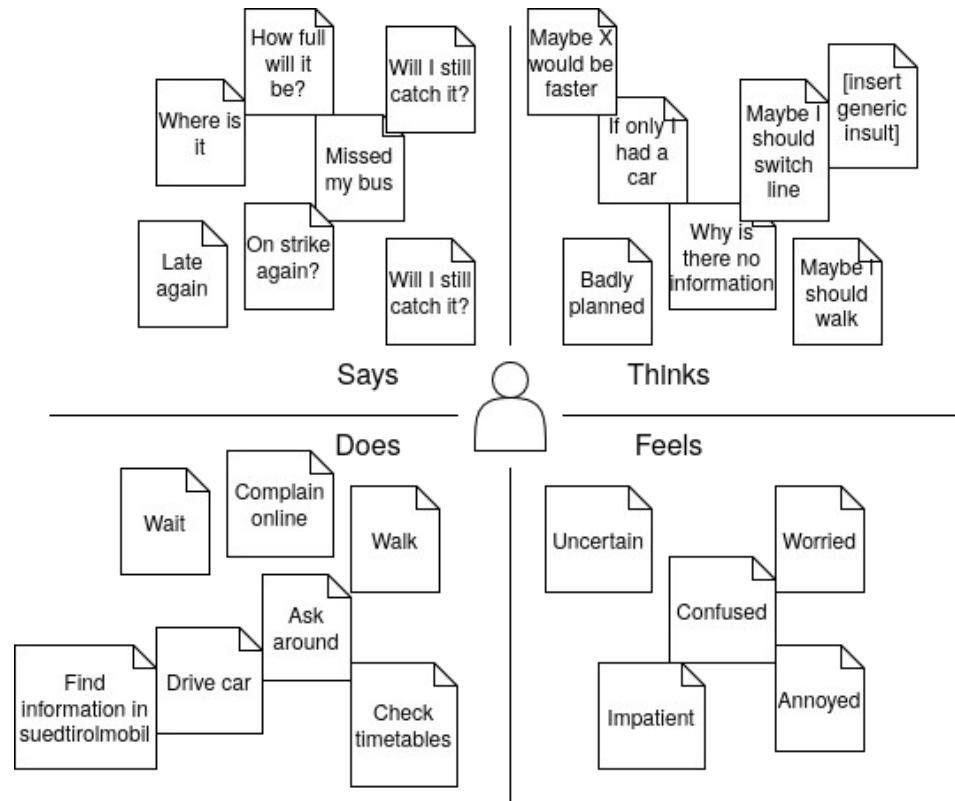
Create an Affinity Diagram (photo is fine).

Then provide:

- 3 Key Insights
 - Insights that go beyond what your group had understood so far.
 - There is a uniform interest in our application

- Almost everyone uses the suedtirolmobil App, making possible integration with it important
- More than 70% of people utilize public transport, yet its punctuality rating only sits at about 55%
- 2 New Problems Identified
 - Problems that were not visible before conducting this research.
 - GPS tracking unreliable
 - Not everyone uses apps for navigating public transport
- 3 Opportunities / Project Directions
 - Three possible directions for your HCI project that emerged thanks to this assignment.
 - Combination with physical infrastructure would improve usability for less tech literate people
 - Integration with suedtirolmobil to make tracking specific connections easier
 - Possibly create our own standalone app with timetables, tracking etc., rivaling suedtirolmobil. This would require much more effort to deliver a superior experience in order to motivate users to switch.

Empathy Map



Key Insights Empathy Map

- Tracking and Utilization are requested features
- Large user-base of suedtirolmobil
- Dissatisfaction with current situation

Journey Map

Running Late Riccardo

Scenario: Riccardo is running late and needs to catch a bus. The problem is he has **no real-time information** about whether the bus is delayed, early, or already passed.

Expectations

- Clear, reliable real-time bus positions
- Quick access with minimal steps
- Accurate, updated arrival times
- Integration with existing suedtirolmobil lines



Riccardo realizes he might miss his bus

Actions:

1. Checks the timetable he remembers
2. Determines when the bus should arrive
3. Opens suedtirolmobil to confirm the static schedule.

Mindset:

- "I hope I'm not too late..."
- "If only I knew where the bus is right now."

Opportunities:

- Add real-time location directly in suedtirolmobil
- Provide quick "Where is my bus?" button.

Riccardo tries to figure out if the bus is delayed.

Actions:

4. Looks up alternative connections.
5. Refreshes the app repeatedly hoping for delay updates.
6. Texts a friend, "Did your bus arrive already?"

Mindset:

- "This shouldn't be so complicated..."
- "Why can't I just see the bus on a map?"

Opportunities:

- Show real-time arrival predictions
- Display bus GPS location on map
- Reduce mental load by offering clear delay indicators.

Riccardo evaluates what to do.

Actions:

7. Decides whether to run or walk calmly.
8. Checks alternative routes like trains or other lines.
9. Chooses between waiting or walking to another stop.

Mindset:

- "Do I sprint, or do I wait?"
- "This is stressful... I'm probably going to miss it."

Opportunities:

- Offer alternative route suggestions automatically.
- Predict whether the bus will be early/late.
- Reduce stress with reliable real-time reassurance.

Riccardo evaluates what to do.

Actions:

10. Commits to one option:
 - rush to the stop
 - switch routes
 - gives up and waits for next bus

11. Hopes he made the right decision

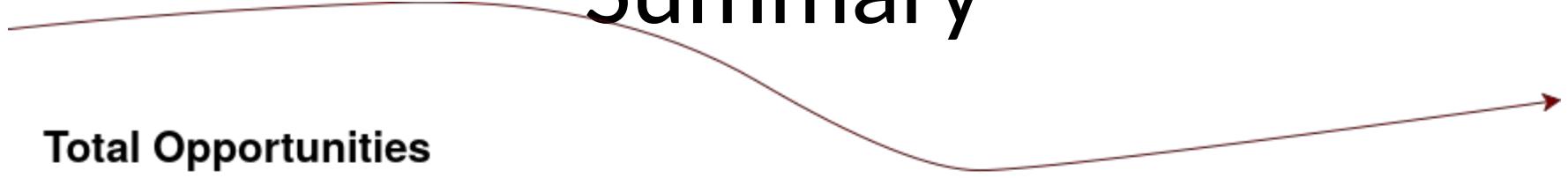
Mindset:

- "I hope this was the right choice."
- "This would be so much easier with real data."

Opportunities:

- Provide post-trip feedback to improve accuracy.
- Push real-time alerts *e.g.: Bus is 4 minutes late)

Emotional Curve – Opportunity Summary



Total Opportunities

Define:

- "Where is my bus?" quick-access feature
- Real-time position integrated into suedtirolmobil

Compare:

- Map with live bus GPS
- Real-time arrival predictions
- Clear visual delay indicators

Negotiate:

- Suggest faster or alternative routes automatically

Select:

- Push notifications for delays or early arrivals
- Feedback loop to improve ETA accuracy

Lifestyle Board

Habits

- Habitual Transport Users
 - Same lines/connections (e.g. going to training/uni/school)
 - checks their connections for delays / expects delays
 - checks if there are free seats/spots in the bus

Environments

- Urban
- Rural
- Anywhere with public transport connections

Values

- Reliability
- Trustworthiness
- Comfort / Utility

Aesthetic World

- Serious design
- Data driven
- Information > Design
- Simplistic

Naming

A. Pillars - Values - Keywords

Pillar	Values	Keyword
1. Reliability	Accuracy Trust Predictability	Pulse
2. Clarity	Simplicity Transparency Ease	Clear
3. Movement	Speed Fluidity Mobility	Flow

B. First Naming Exploration

Recurring Themes

Reliability	Clarity	Movement	Cross-themes
real-time heartbeat / pulse live / now certainty / stable	transparent simple clear visible insight	motion flow route glide go / move / shift	“Live movement you can trust” “Clarity in motion” “Real-time transparency” “The pulse of mobility”

Useful Words, Roots & Sounds

Words:

- Pulse, Clear, Flow
- Live, Track, Path
- Move, Route, View
- Sync, Line, Map

Roots:

- geo (earth/location)
- via (route)
- mot / move
- lum / clear (clarity)

Sounds:

- Short, sharp: pulse, ping, snap
- Smooth, flowing: flow, move, glide
- Clear, light: clear, lumi, view

Initial Name Directions

Combine keywords:

- PulseFlow
- ClearRoute
- FlowMap

Theme-based:

- RouteSync
- CityPulse
- MoveNow

More abstract:

- Flumo
- Lumio
- GeoPulse

What works

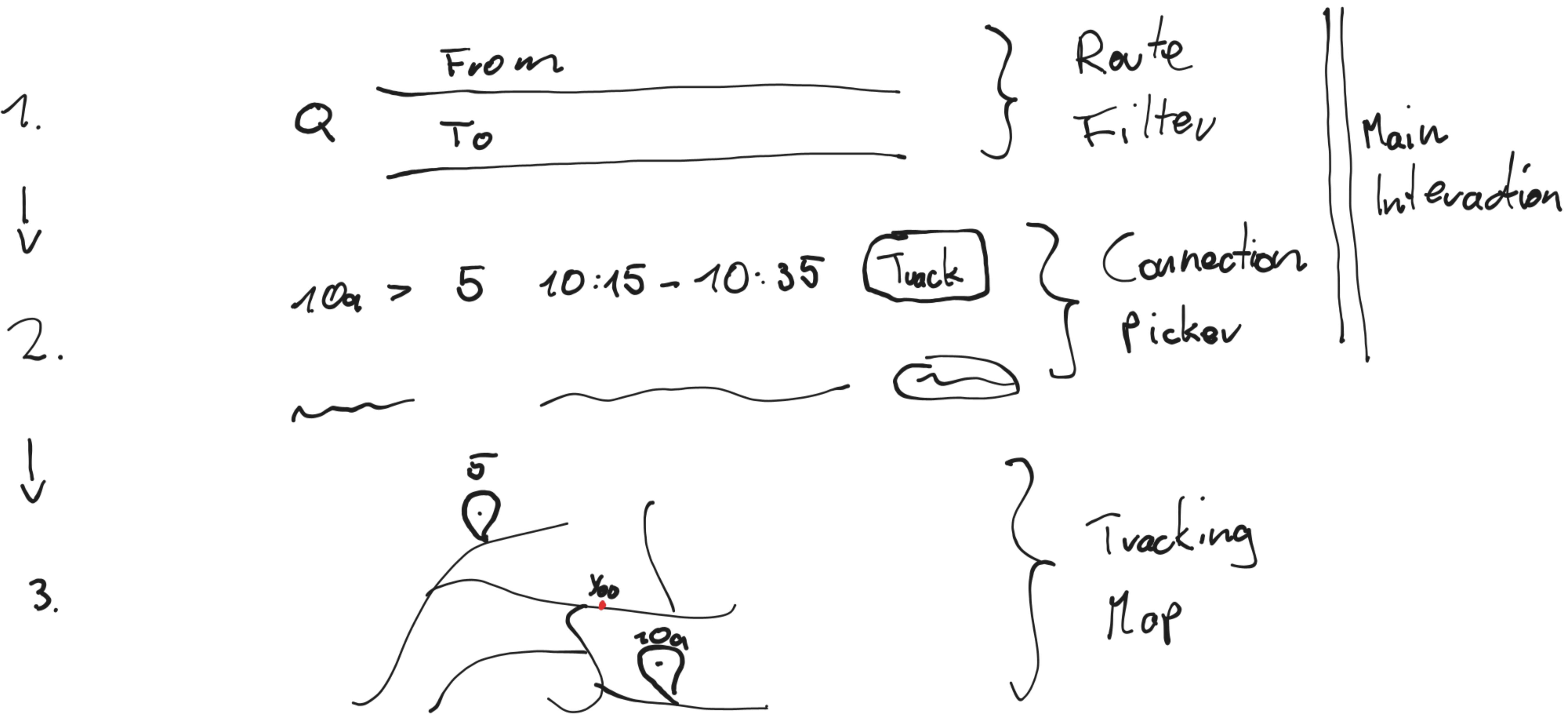
- User gets to pick their route
- Connection location available on demand
- Similar to swedtirod mobil

Testing needed

- Unstable GPS
- Multiple connection tracking

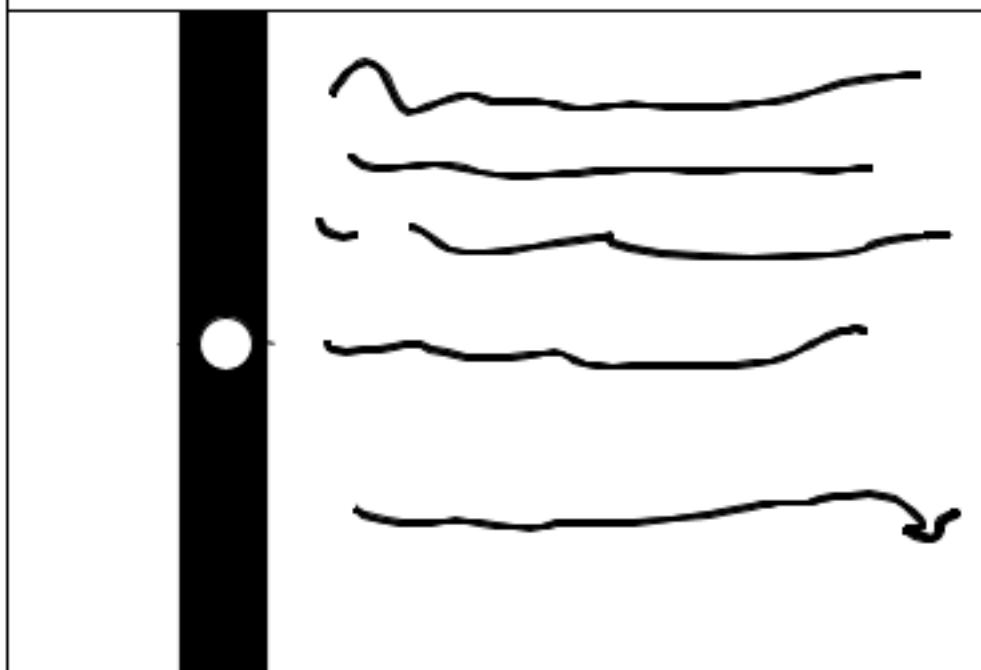
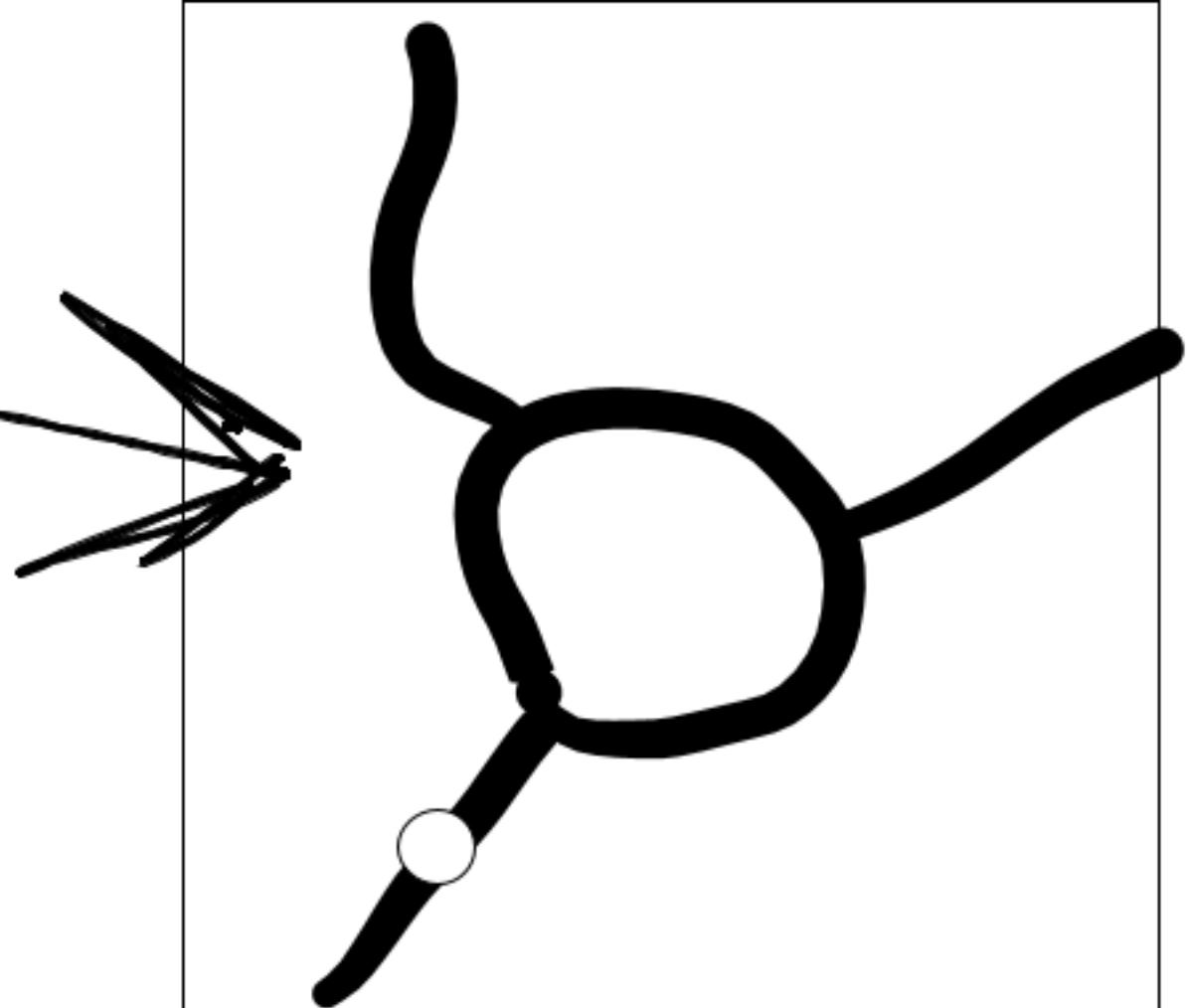
Next Prototype

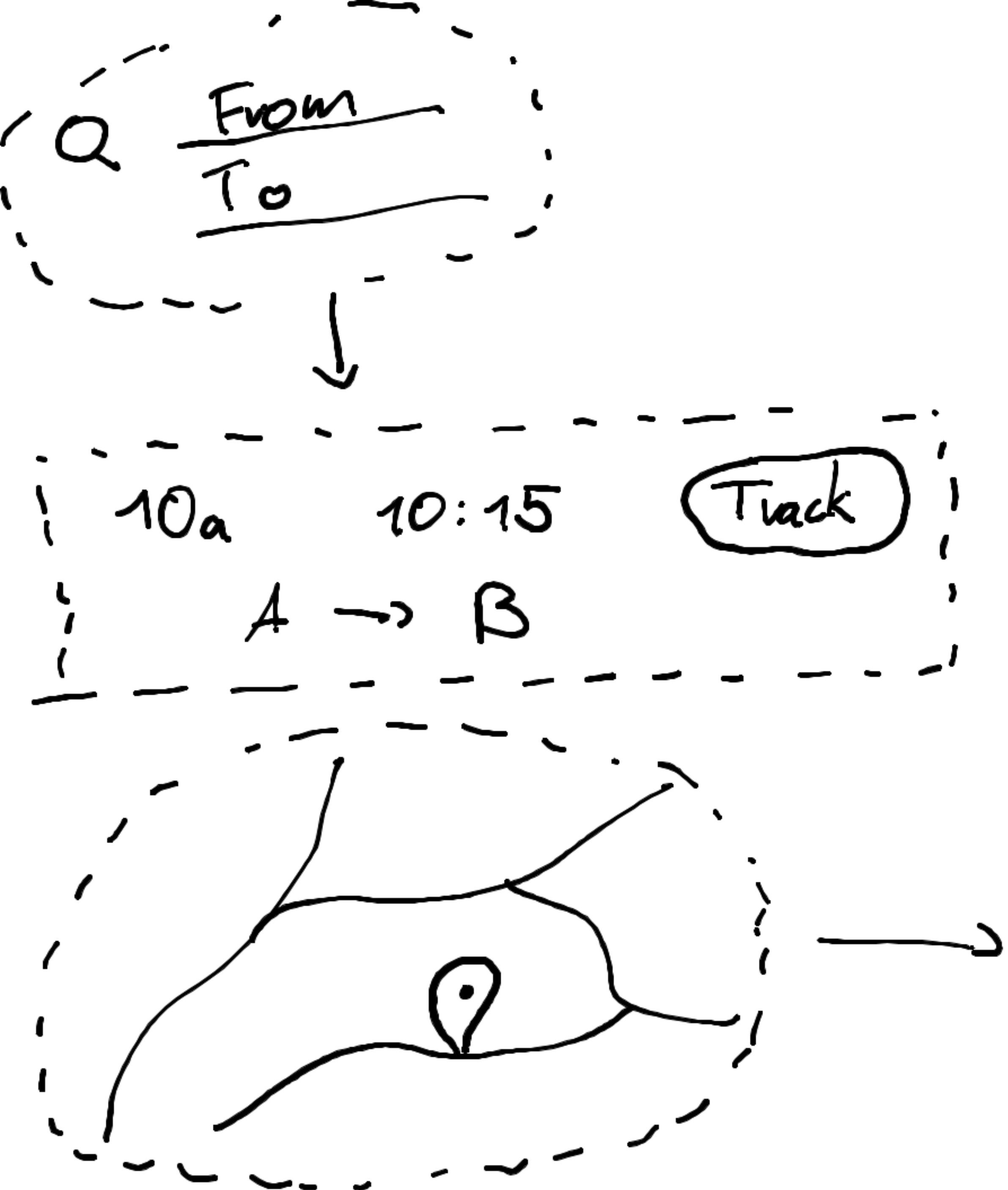
- Route selection
- Multiple connection tracking



MAP

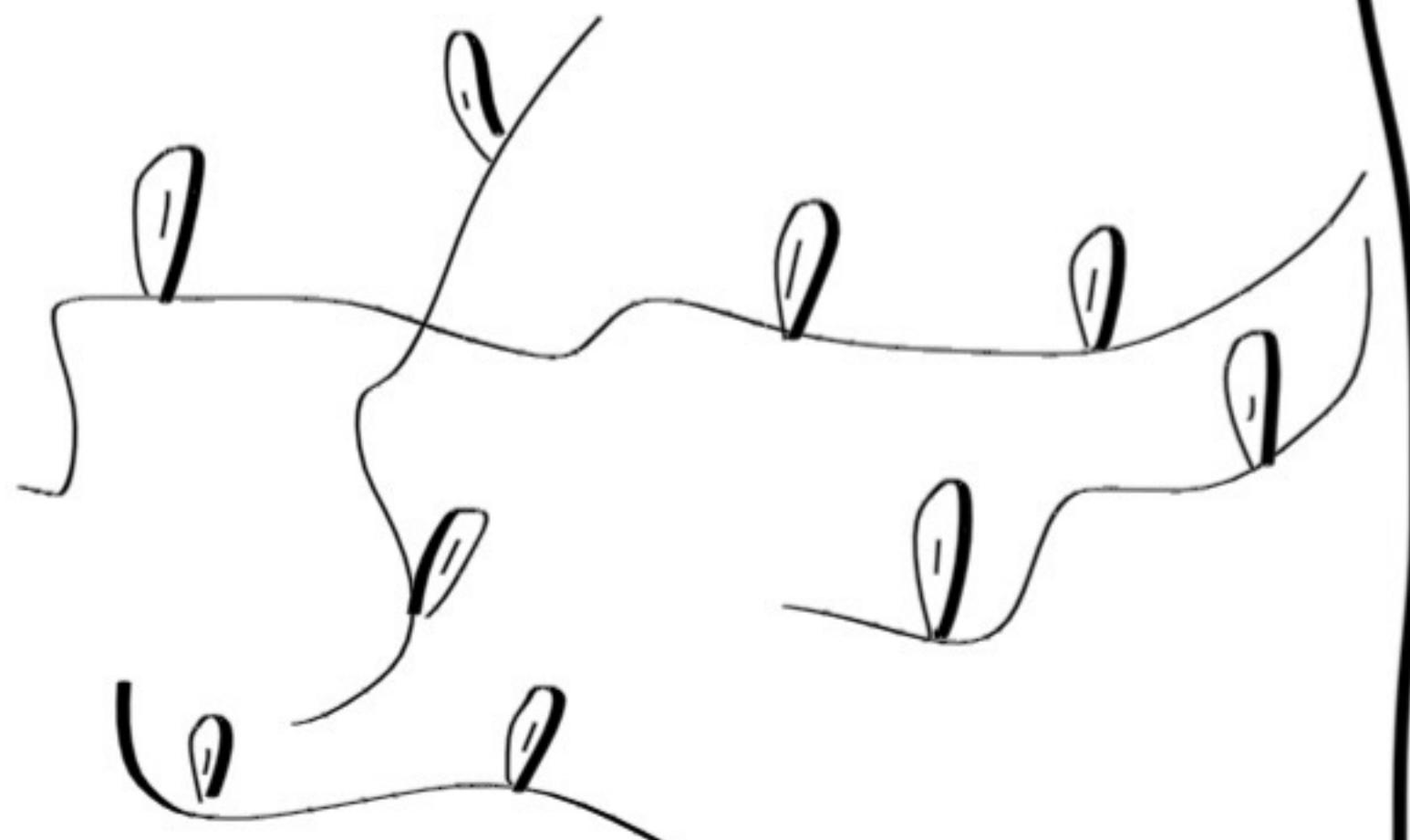
TIME





Q Your location

enter your location to see all routes connected to the stop
and tracked vehicles

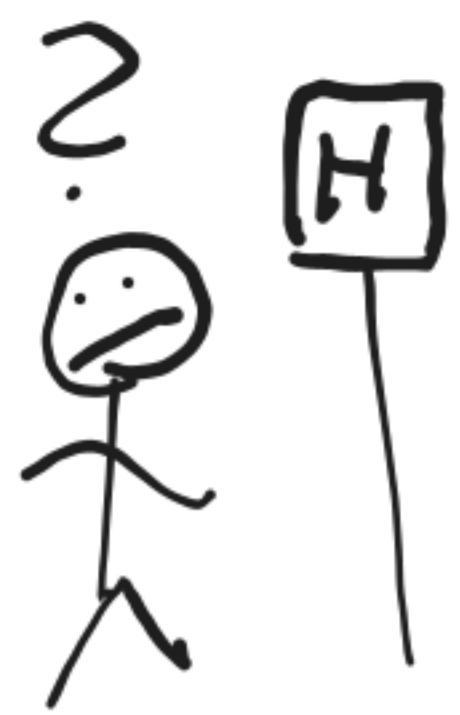


filter

all public transports
in alto adige

This section converts into a timetable if a location is submitted.
Here you can see the arrival time of all the vehicles that cross your stop.

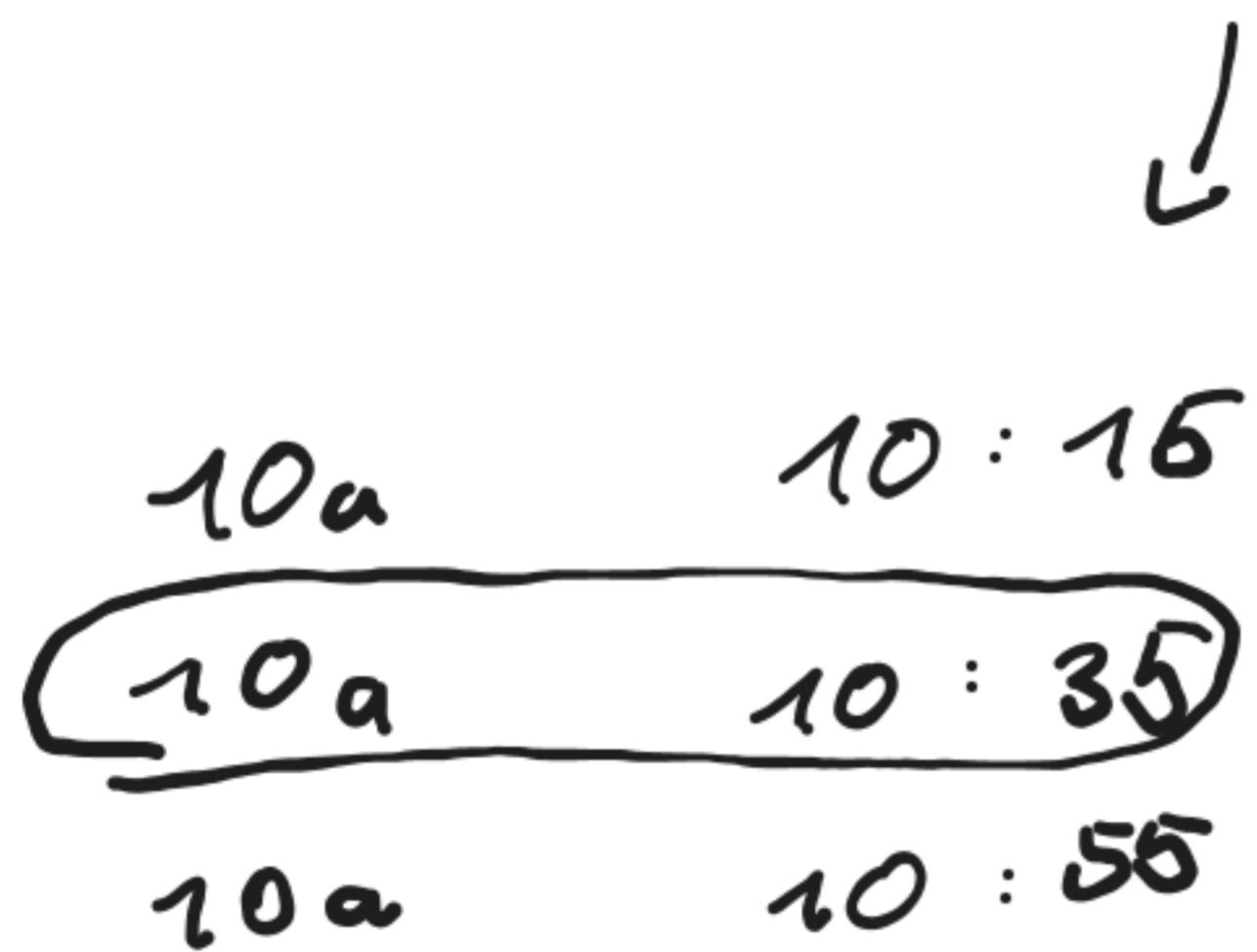
to select preferred routes at the overview



→

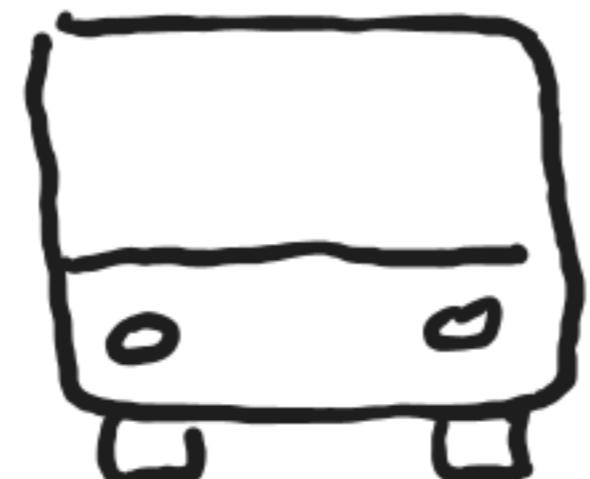
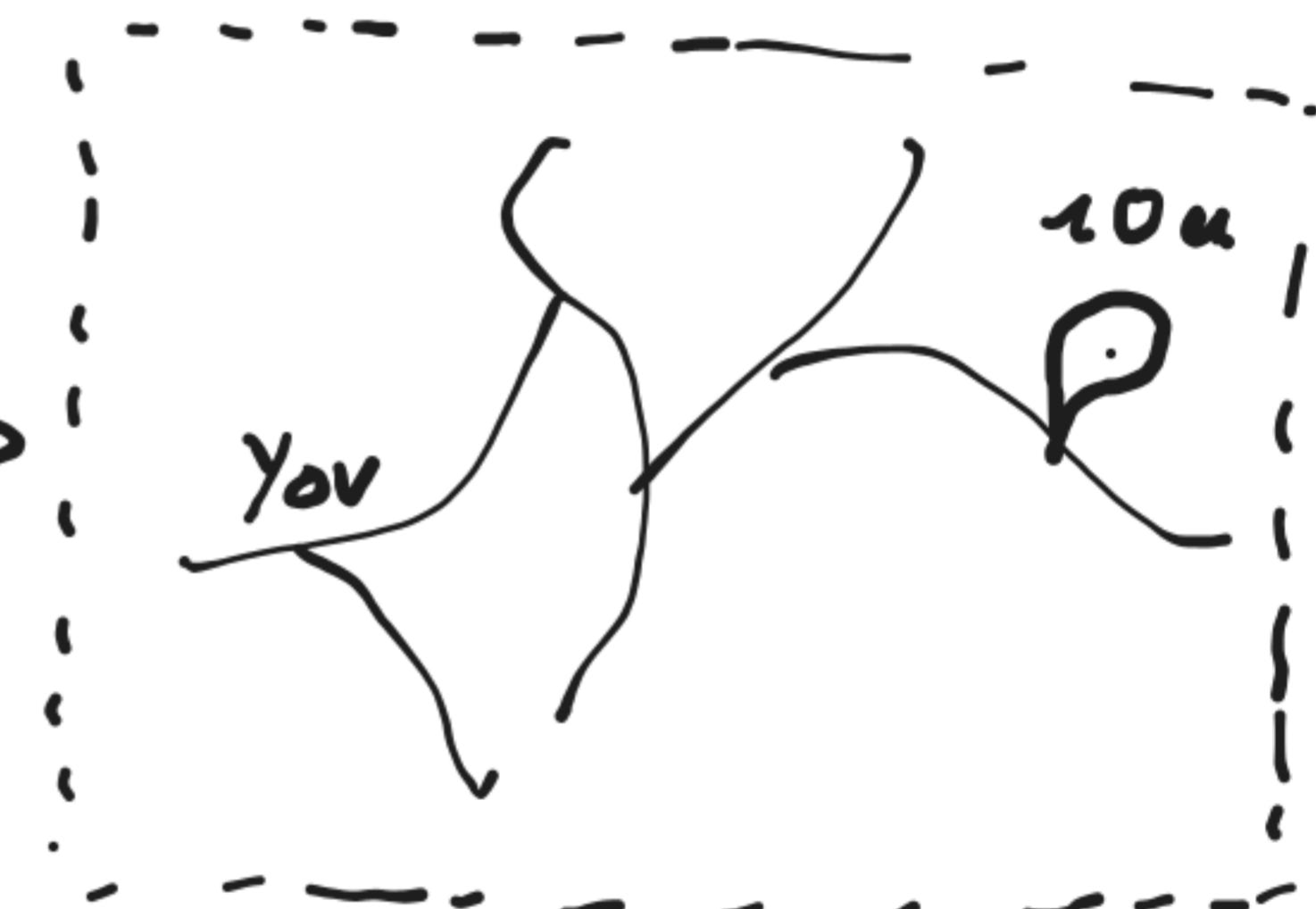
Q

From
To



→

You



←



UVP:

[User = Everyone] + [Problem = Lack of information] = [Unique Value = Tracking]

=> Travel-Insight for everyone

Color palette



#96B940

Inspired by regional bus colors

#FFFFFF

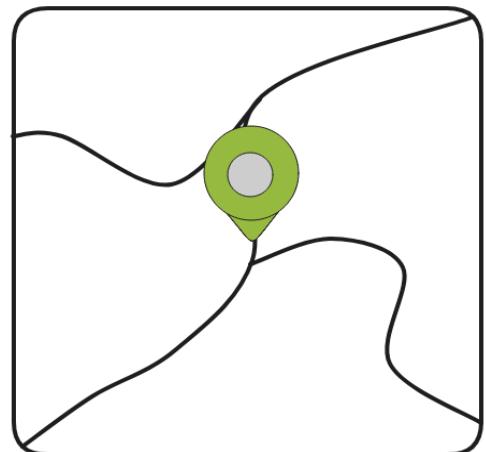
White for contrast

#CDCDCD

Offwhite for accents

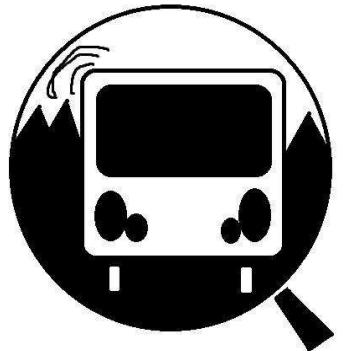
LOGO A - Function

This logo shows a map with a marker, implying the functionality of the application: Tracking public transport



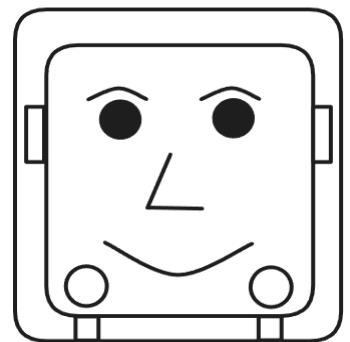
LOGO B - Personality

We are based in South Tyrol and plan to serve that very same area, thus the mountains



LOGO C - Emotion

We want our users to be happy when using our App, instead of stressed because they missed their bus.



Final Logo

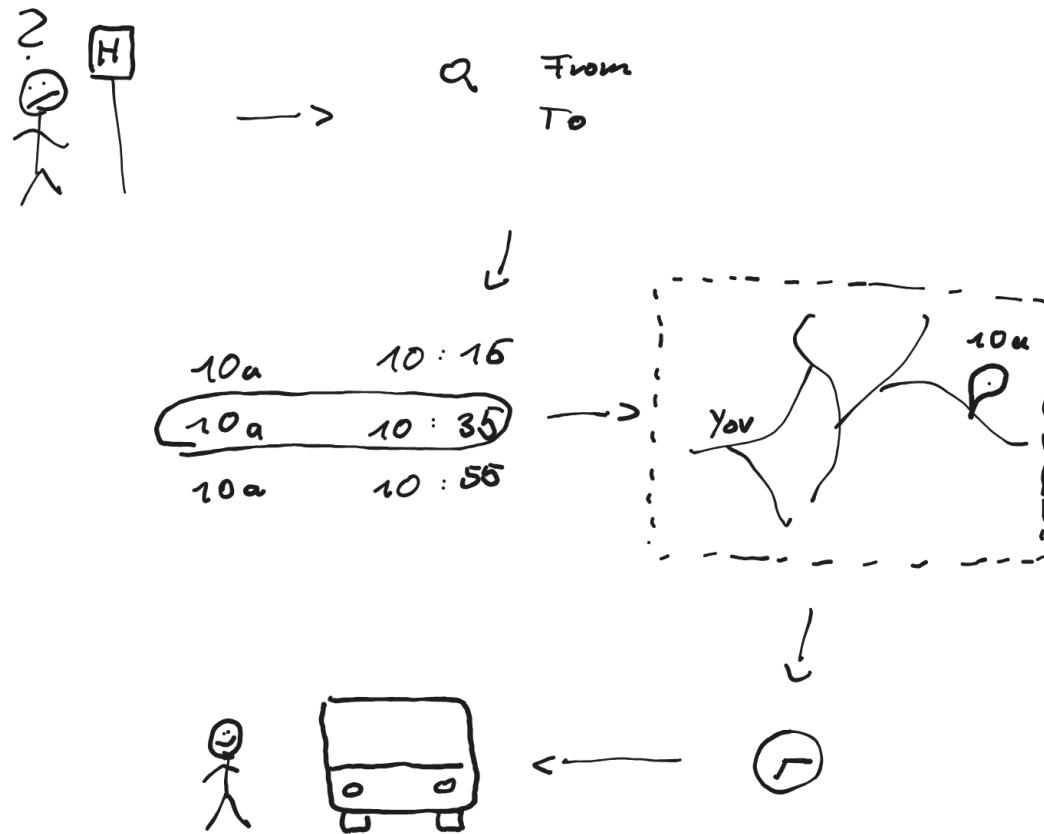
Logo A was chosen as it fits a minimalist design, scales well and shows the base concept of the App. We are not trying to convey emotion but function.

Prototype

Problem

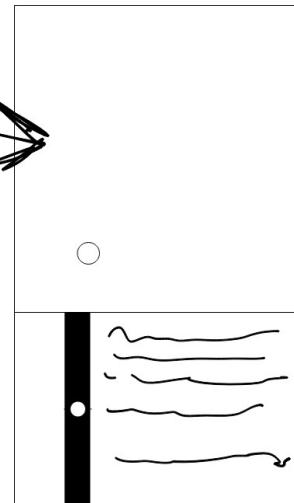
User does not know when / if bus will arrive

User Scenario + Storyboard

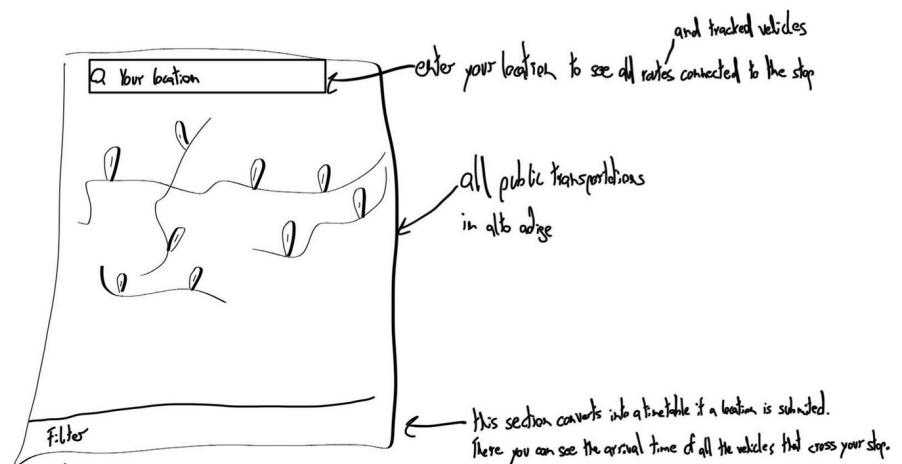
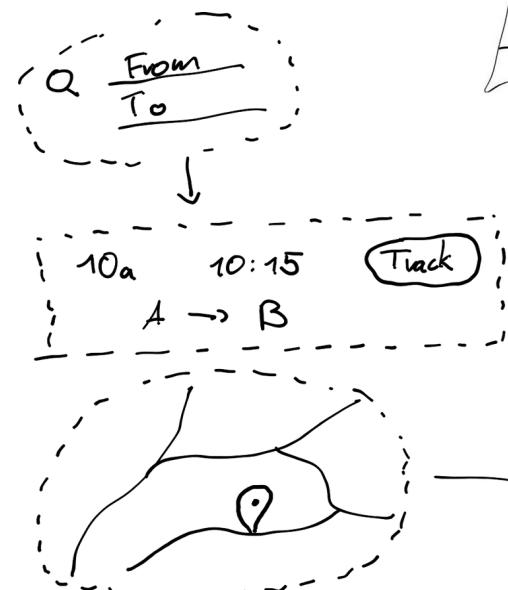


Sketches

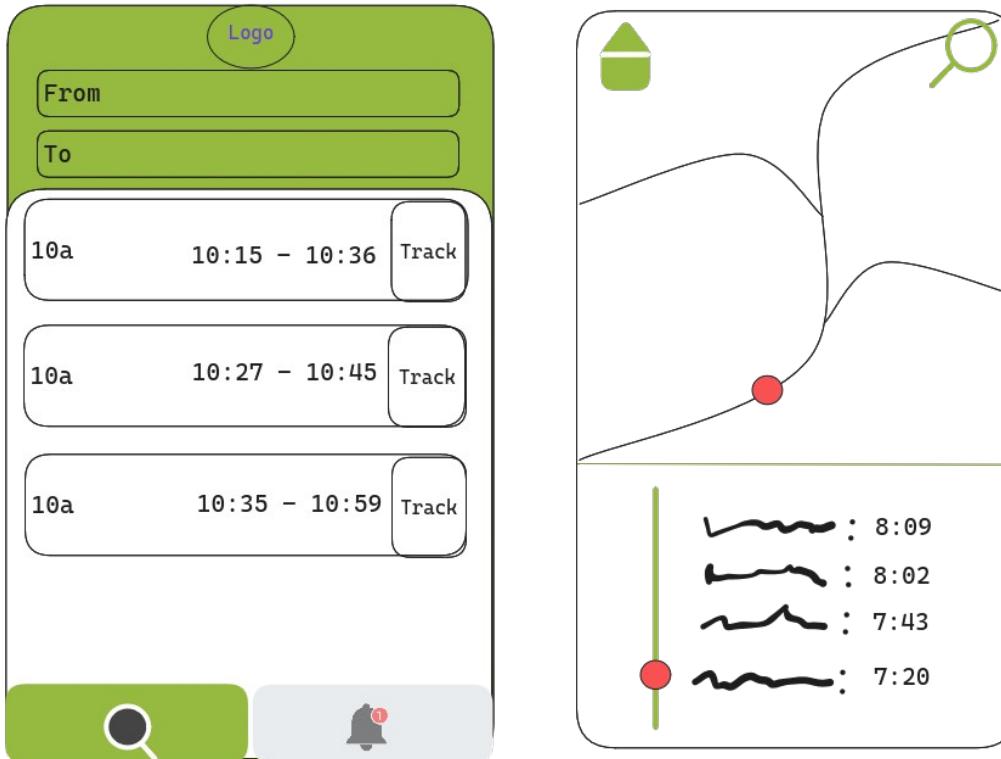
MAP



TIME



Digital Mockup



Feedback

- How easily navigable is the UI?
- Feasible for older / less tech literate users?

Channels

Primary

- Word of mouth → Mobile Apps → In-App Notifs + Email

Secondary

- Physical / Digital Advertisements, Announcements
- WebApp
- WhatsApp Business

Public Transport Tracking

Problem

- Timetables often differ from actual arrival / departure times
- Finding viable transport alternatives often hard due to difficult planning
- Finding best transport option often inconvenient as for example bus might be stuck in traffic

Existing Alternatives

- Static timetables give an indication of when transport is supposed to arrive
- Announcements on train stations for train delays

Solutions

Technology

- GPS based vehicle tracking to allow for accurate position and arrival time determination

Design

- Progressive Web App to enable the widest possible User-base to have access
- Integration with existing public transport apps to ease usability

Ethics / Social

- Improved public transport experience



Key Metrics

Unique Value Propositions

- Public Transport Users + Advanced and Dynamic Information + Convenient and Easy to Use Design = Dynamic Timetables for travelers

High Level Concept

- Public transport tracking for everyone

Unfair Advantage

Channels

- First awareness
 - Physical advertisements at bus / train stops
 - Posters in / around public transport
 - Homepage
 - Word of mouth
- Access interface or prototype
 - Mobile phones
 - Desktop webpage
 - Homepage link
- Continuous learning and feedback
 - In-App notifications
 - Push notifications
 - Email Feedback poc
 - WhatsApp Business Contact

Customer Segments

- Users
 - The average Joe trying to use public transport
 - The general public
- Customers
 - Public transport providers
 - Private transport companies

Early Adopters

- Ideal customer
 - Willing to invest in hardware and software to make the project possible
 - Willing to offer time for us to test and improve solution
 - Willing to pay for the software maintenance and upkeep post initial install
 - Interested in our solution to provide improved service to users

Cost Structure

Revenue Streams

Category	Examples
Human Resources	Developer, Prototyper, Actors (Ads)
Tools / Technologies	GPS, Web, Responsive Application Development
Materials	Embedded Computer, GPS Sensor, Server Infrastructure, Development Infrastructure
Operations / Time	Testing, Iteration, Development, Advertisement
Ethical / Safety	Testing Environment, Consent for Tracking, Feedback Collection

Item	Category	Quantity	Time (h)	Unit Value (€)	Total Cost (€)	Priority (E/O)	Description
Developer	Human Resources	3	200	€ 12.50	€ 7,500.00	E	How many developers for how many hours
Prototyper	Human Resources	1	50	€ 12.50	€ 625.00	O	How many prototypers for how many hours
Actors (Ads)	Human Resources	3	20	€ 100.00	€ 6,000.00	O	How many Actors for how many hours
Embedded Computer	Materials	5		€ 90.00	€ 450.00	E	How many Computers
GPS-Sensor	Materials	5		€ 25.00	€ 125.00	E	How many GPS Sensors
Server Infrastructure	Materials	1		€ 2,000.00	€ 2,000.00	E	How many Servers
Development Infrastructure	Materials	3		€ 1,000.00	€ 3,000.00	E	How many Development Machines
Testing	Operations / Time	1	20	€ 5.00	€ 100.00	E	How long does Testing take and how much cost is associated with
Iteration	Operations / Time	10	20	€ 5.00	€ 1,000.00	E	How long to develop and how many updates will be delivered
Development	Operations / Time	2	200	€ 5.00	€ 2,000.00	E	External Development costs
Advertisement	Operations / Time	50		€ 1.00	€ 50.00	E	How many Ads to we want to publish
Testing Environment	Ethical / Safety	1	20	€ 10.00	€ 200.00	O	Cost of Testing Resources
Consent for Tracking	Ethical / Safety	1			€ 0.00	E	Consent for Data analysis
Feedback Collection	Ethical / Safety	1	20	€ 8.00	€ 160.00	O	How much for someone to respond to feedback
Total					€ 23,210.00		

Reflection

Our heaviest cost are the developers

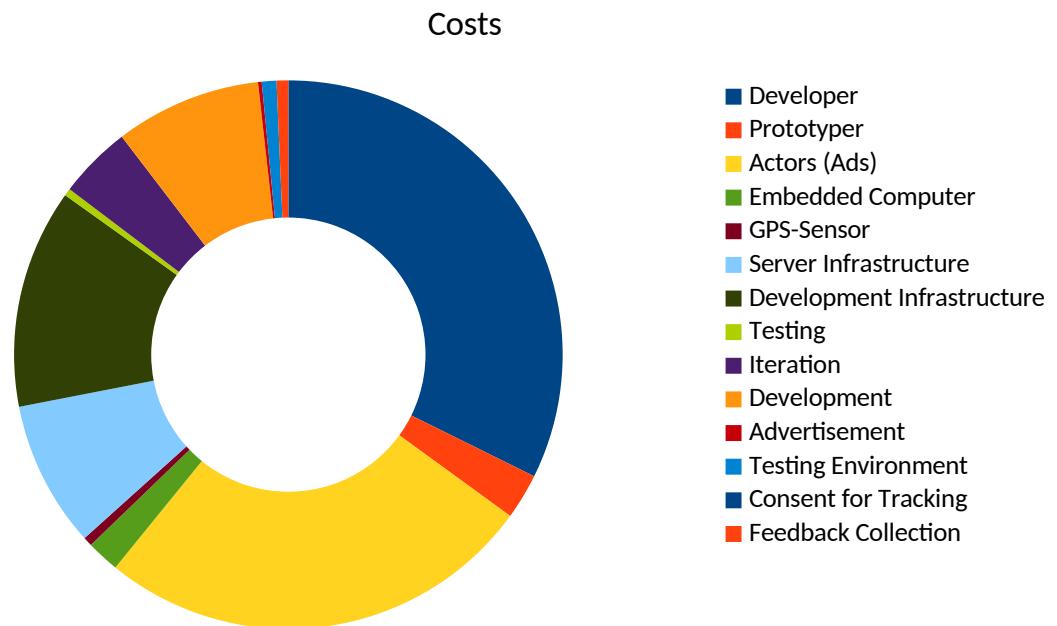
We could cut the Actor for Advertisement (or Ads at all) and the

Prototyper

~~nope our prototyping is not efficient, we need GPS-sensors and embedded computers (for data transfer)~~

Graph

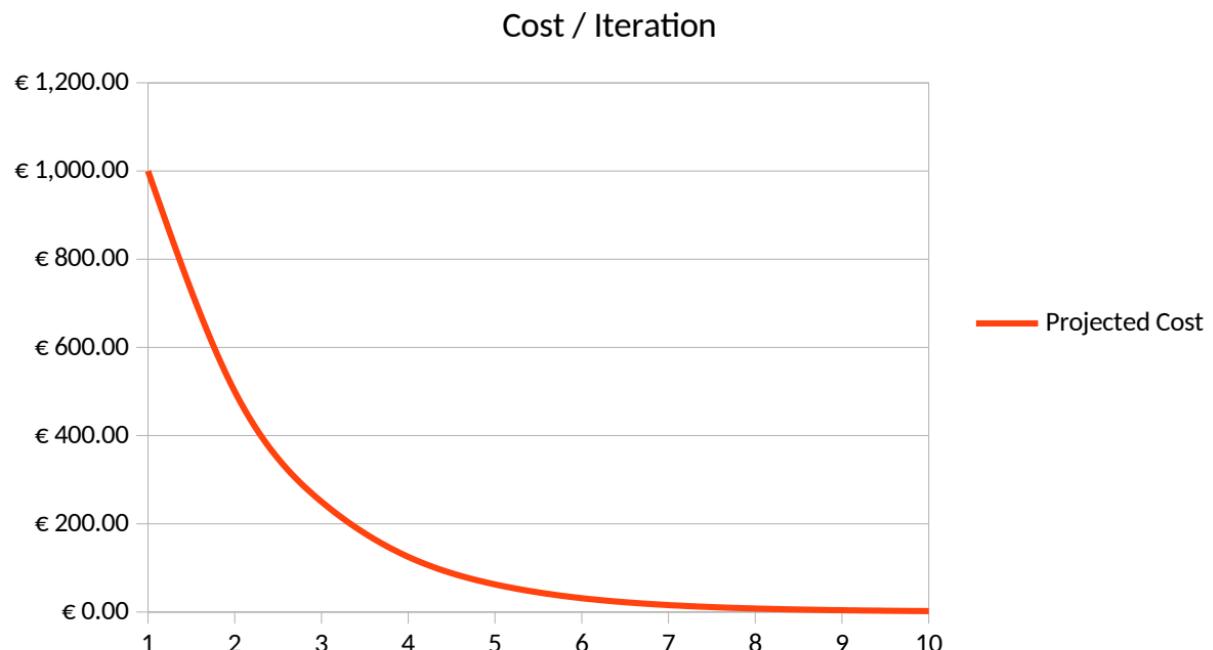
No clue what graph?



Metrics	Description	Value
	(Time × Hourly symbolic value) + Materials + Tools	€ 23,210.00
CPI	Total testing effort / Number of users	€ 232.10
CPU	Useful insights / Number of users	100
IY	IY / CPU	0.430848772081
DSS	Roughly the amount of users we expect	100
Users	Insight per user	0.3333333333333333

Base Cost	Iteration No.	Projected Cost
€ 1,000.00	1	€ 1,000.00
	2	€ 500.00
	3	€ 250.00
	4	€ 125.00
	5	€ 62.50
	6	€ 31.25
	7	€ 15.63
	8	€ 7.81
	9	€ 3.91
	10	€ 1.95

Since the development will stagnate eventually, costs will get progressively lower since newer iterations will just be minor bugfixes instead of major feature pushes



Public Transport Tracking

<h2>Problem</h2> <ul style="list-style-type: none">Timetables often differ from actual arrival / departure timesFinding viable transport alternatives often hard due to difficult planningFinding best transport option often inconvenient as for example bus might be stuck in traffic <h2>Existing Alternatives</h2> <ul style="list-style-type: none">Static timetables give an indication of when transport is supposed to arriveAnnouncements on train stations for train delays	<h2>Solutions</h2> <p>Technology</p> <ul style="list-style-type: none">GPS based vehicle tracking to allow for accurate position and arrival time determination <p>Design</p> <ul style="list-style-type: none">Progressive Web App to enable the widest possible User-base to have accessIntegration with existing public transport apps to ease usability <p>Ethics / Social</p> <ul style="list-style-type: none">Improved public transport experience  	<h2>Unique Value Propositions</h2> <ul style="list-style-type: none">Public Transport Users + Advanced and Dynamic Information + Convenient and Easy to Use Design = Dynamic Timetables for travelers <h2>High Level Concept</h2> <ul style="list-style-type: none">Public transport tracking for everyone	<h2>Unfair Advantage</h2> <ul style="list-style-type: none">Unique Data<ul style="list-style-type: none">Proprietary GPS trackersProprietary usage tracking (via App)User habits<ul style="list-style-type: none">If merged with suedtirolmobil, users won't switch to alternatives	<h2>Customer Segments</h2> <ul style="list-style-type: none">Users<ul style="list-style-type: none">The average Joe trying to use public transportThe general publicCustomers<ul style="list-style-type: none">Public transport providersPrivate transport companies <h2>Early Adopters</h2> <ul style="list-style-type: none">Ideal customer<ul style="list-style-type: none">Willing to invest in hardware and software to make the project possibleWilling to offer time for us to test and improve solutionWilling to pay for the software maintenance and upkeep post initial installInterested in our solution to provide improved service to users
<h2>Cost Structure</h2> <ul style="list-style-type: none">Hardware<ul style="list-style-type: none">GPS trackersServer infrastructureDevelopment costs<ul style="list-style-type: none">Feature updatesBugfixesQoL improvementsRunning costs<ul style="list-style-type: none">Power billsLabor<ul style="list-style-type: none">Device installationMaintenance	<h2>Key Metrics</h2> <ul style="list-style-type: none">UsercountDownloadsSupport Tickets / CommunicationComplaints	<h2>Revenue Streams</h2> <ul style="list-style-type: none">indirect revenue<ul style="list-style-type: none">no revenue from users (like suedtirolmobil)possible financing and support by<ul style="list-style-type: none">the province (or trough suedtirolmobil)the users (e.g donations or data for useful statistics in exchange for privacy)partners (possible ads)high non-monetary value for users<ul style="list-style-type: none">significant support for public infrastructurehigh benefit for users trough live trackingbetter time management trough main functionality and high usabilityin general, high functional, social and (partially) emotional valuewell-being because of a trustworthy and local serviceonly userdata for statistics and improvements which (user gets informed and must consent)	<h2>Channels</h2> <ul style="list-style-type: none">First awareness<ul style="list-style-type: none">Physical advertisements at bus / train stopsPosters in / around public transportHomepageWord of mouthAccess interface or prototype<ul style="list-style-type: none">Mobile phonesDesktop webpageHomepage linkContinuos learning and feedback<ul style="list-style-type: none">In-App notificationsPush notificationsEmail Feedback pocWhatsApp Business Contact	

Felix

- Filter for which type of connection and time frame
- Favorite Stations feature
- Proximity notification
- Integrate into suedtirolmobil instead of creating new standalone app
- Add delay information in connection list
- Ticket prices
- Ticket booking
- Add map with stops marked to show buses passing by
- Replace back button with search bar
- Push notification

Samuel

- maybe legal issues
- to see via google maps api (?) if the bus is in traffic
- how to track if a bus has an accident
-

Key Metrics

- Usercount
- Support Tickets / Communication
- Complaints

Unfair Advantage

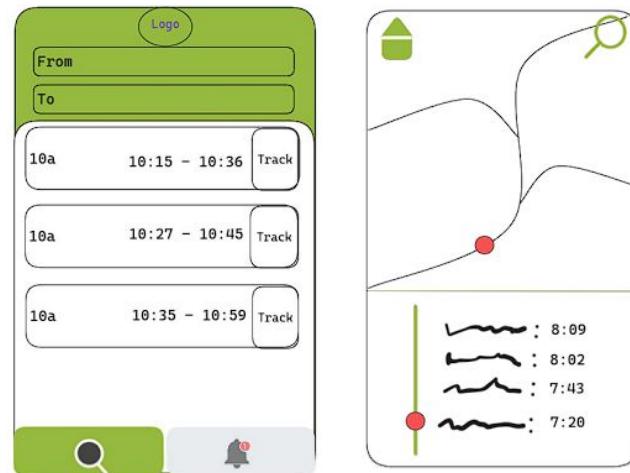
Our unfair advantage is the proprietary data we use to make our app function as well as user habits by integrating with pre-existing solutions.

Testing & Refinement Report

Project & Prototype Overview

Group 6: Public Transportation Tracking

Description: Our project consists of a public transportation service that allows users to track public transportation live via GPS.



In-class Testing (Round 1)

- Approximately 6-8 Testers
- Following tasks used:
 - Answering questions: Giving us feedback about our project idea in general and if they would use an app like this

First Refinement

- Changed from GPS only to use a combination of GPS + proximity data for tracking
 - Has the added benefit of also supplying us with approximations for vehicle utilizations

External Testing

- Approximately 15 Testers
- Following tasks used:
 - Navigating through our dynamic mockup and giving us feedback
 - Assume the position of a potential user and give us input as to what they deem to be essential features

Final Refinement (Prototype v3)

- Added filter by mode of transport
- Added Favorite stations
- Added Google Traffic Data as additional input for time estimates

Reflection

- Things learned
 - Testers can give valuable feedback even very early in the development
 - Testing shows which features are actually requested or needed
- Things to improve
 - Consider integrating all our functionality in already existing suedtirolmobil App in order to preserve user base while also lowering the bar of entry by not having to create an entire separate application from scratch

Reflection & Next Steps

During the hackathon, we did not make any further changes to our project, as the direction is relatively clear to us. Instead, it served as an insight into our project. The scope of the project was also clearly defined, but one question remains: will this project actually be implemented in the future, or do we want to start a petition or send our main aspect of the project to “STA” so that they can integrate it into their “Südtirolmobil” app? For the benefit of the users, it is best if this user experience is already integrated into an app that they use regularly without forcing them to switch.

In addition, during the course of our development, we decided to expand our project further thanks to useful feedback during the testing phase (in-class testing). A service where users can see how full the bus is. This would be based on the same concept as Google Maps, where you can also get traffic data when planning your route (red road = heavy traffic, green road = light traffic).

TEAM INTRODUCTION

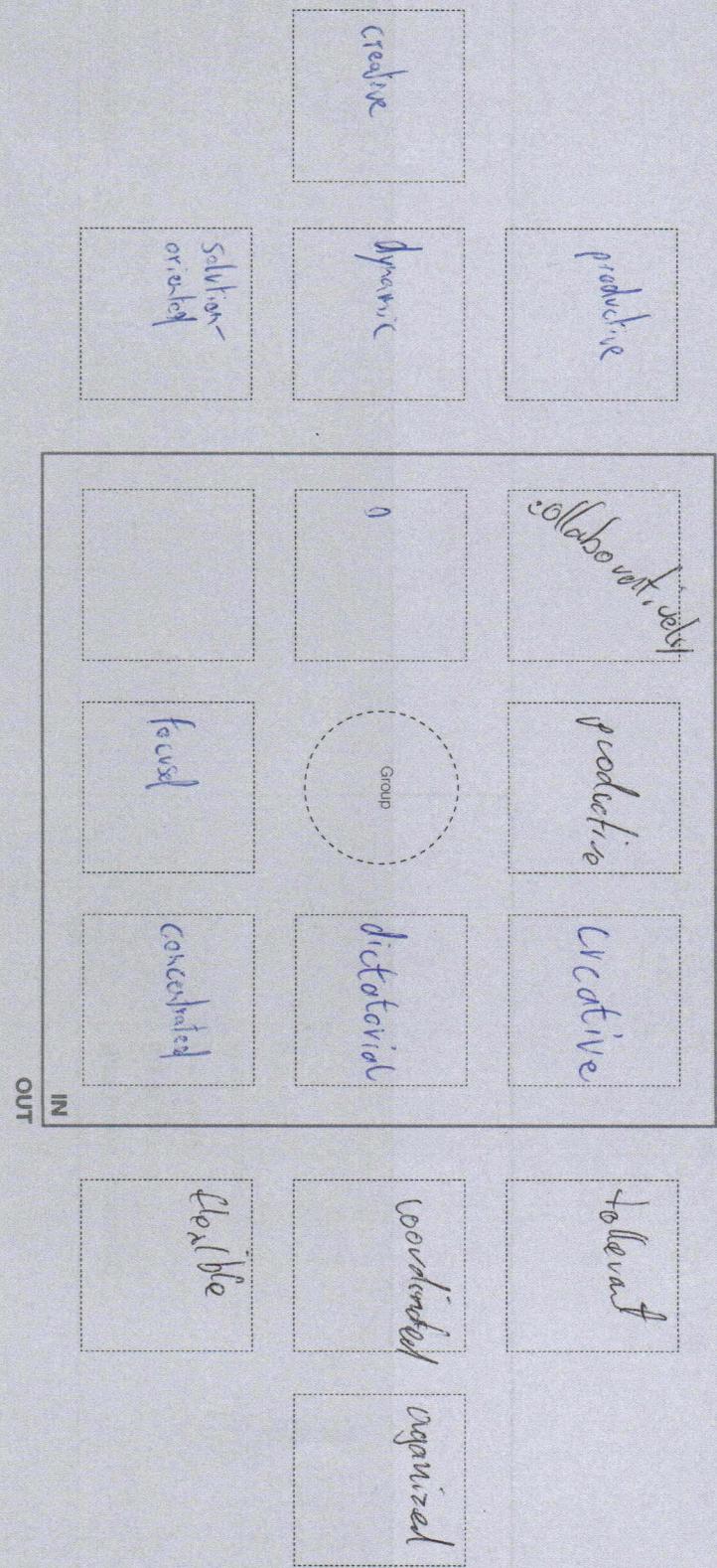
<p>Name and Surname: Samuel Son Background: IT - School Programs: superpowers: Creativity Dislikes: Nonsense</p>	<p>Name and Surname: Andrey Lazarev Background: IT - School Programs: superpowers: Technical know-how Dislikes: Samu Q</p>
<p>Name and Surname: Felix Börr Hell Background: Programmer Programs: superpowers: Focus Dislikes: Inconvenience</p>	<p>Name and Surname: Background: Programs: superpowers: Dislikes:</p>

TEAMWORK

02

Team work environment

How do you envision working together? Discuss and agree on how you want to work as a team. Work individually for a few minutes. Place your individual post-it notes on the template. Then discuss as a group and select eight words that best represent your team and how you want to work together. What behaviors do you collectively agree to foster a productive and healthy work environment for your team?



PRIORITY

Market Selection Criteria

Take up to 6 specific market segments you identified in the mind map exercise and prioritize them based on the selection criteria below.

Market Segment 01

Market Segment 02

Market Segment 03

Market Segment 04

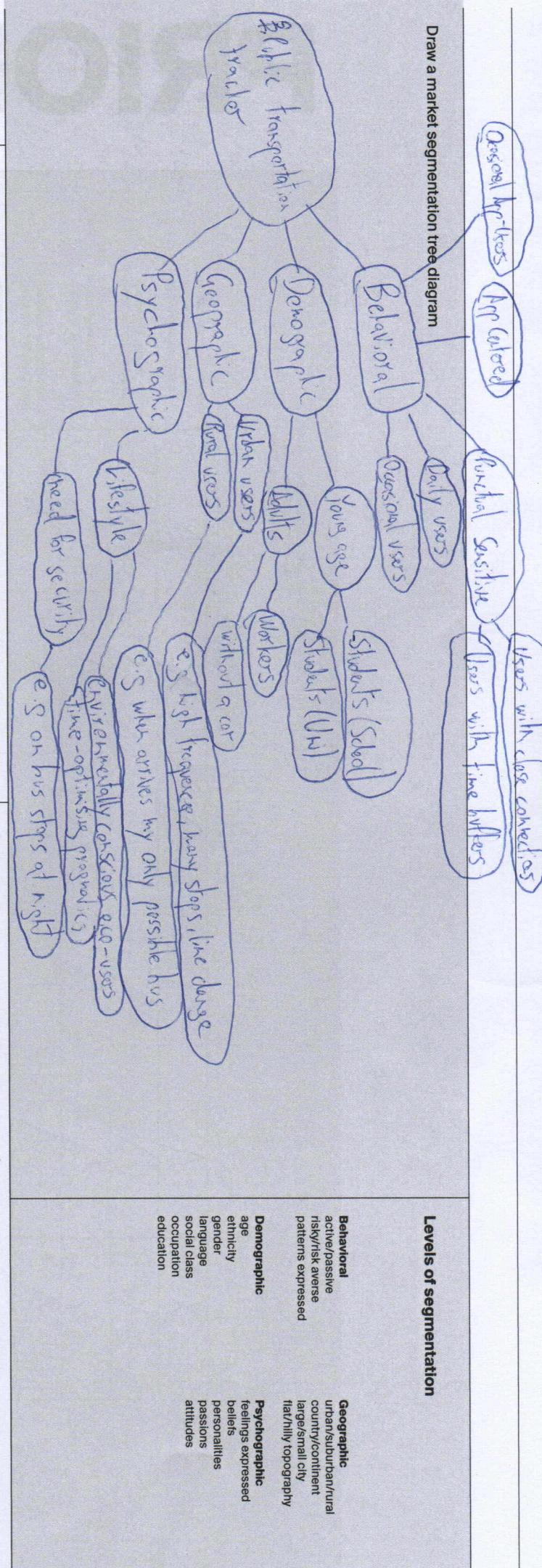
Market Segment 05

Market Segment 06

	Daily users	Students	Workers	Urban users	Rural Users	Occasional U.
Segment has the need you identified	✓	✓	✓	✓	✓	✗
Segment shows interest in a solution	✓	✓	✓	✓	✓	?
Segment has purchasing power	?	✗	✓	?	?	?
Room for competition in the segment	✓	✓	✓	✓	✓	✓
Segment will lead to additional markets	✗	+	+	+	+	✗
Segment is easily accessible	✓	✓	✓	?	?	✗
Does the segment need the same exact product?	✓	✓	✓	✓	✓	✓
Segment is growing or trend emerging	✓	✓	✓	✓	✓	✓
Segment conforms with the team's values	✓	✓	✓	✓	✓	?
Will you achieve your social/environmental impact with this market?	✓	✓	✓	✓	✓	✗
Workas	Students	Daily Users				

Select and rate the top 3 market segments you want to further explore/work toward.

MARKET VARIABLES



Identify as many potential market segments as possible for your solution. Use at least 3 of the markets you listed on template 1.2.1 as starting points, and use them to branch out and make multiple variations for each segment.

Use a mind-mapping tool or tree diagram to display all the potential markets you should evaluate. Explore different levels of market segmentation. See list above as guidance.

POLIMIT
HACIK

INSIGHTS

01

What insights did your prototypes give you?

Necessity for search filter

Station favourites needed

Highly welcome addition to public transport

02

How your prototypes help you communicate your idea?

clear prototype
goal easily recognizable
no introduction needed due to similar interface

PROTOTYPE

01

Prototype

Make a prototype to answer one of your three pressing questions you identified earlier. Note that the prototype can be for a specific part(s) of your solution or the full solution. Paste photographs/diagrams/screenshots here.

How accurate have the updates been?

0 Not at all 2.5 5 Very

popup

02

Prototype Preparation

Make a bullet list of actions and resources you need to build your prototype.

- Programming
- Update server
- Update app
- Developers
- Designer

PROTOTYPE IDEAS

01 What will you prototype to answer the first pressing question about your solution?

User counter to keep track of requirements

02 What will you prototype to answer the second pressing question about your solution?

Stress test to test reliability
Early access launch to collect feedback

03 What will you prototype to answer the third pressing question about your solution?

Implement feedback collection + to collect ~~results~~ accuracy voting

POLIMIT
HACK

Identify risks and uncertainties
Formulate questions to reduce risk
Answer questions quickly and cheaply
Start with focused questions, then move to comprehensive

Notes

A sketch of your key specifications for your solution is the first visualization of an idea, and a crucial part of the design process.

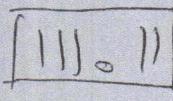
SKETCH

01

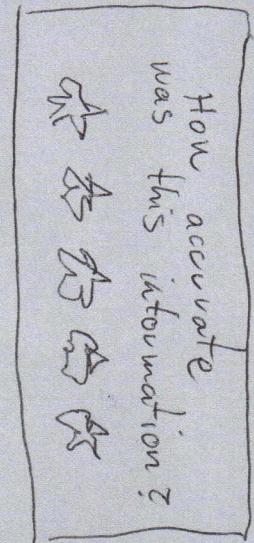
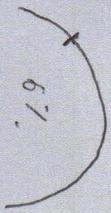
Sketch
Sketch various versions of possible solutions to your questions

How to sketch a press leaf? Do not think this applies

User connected: 5629



Server utilization



HOW MIGHT WE?

O1 Develop and write the HMW question that is going to drive your project.

How might we

improve the visibility and functionality of an existing public transportation app?
How might we create real value for the users?
How might we create an app with a tracking function?

O2 Evaluate the possible solutions with these three outcomes

HUMAN OUTCOMES
Improved visibility reduces confusion

SOCIAL OUTCOMES
Increased public transport adoption

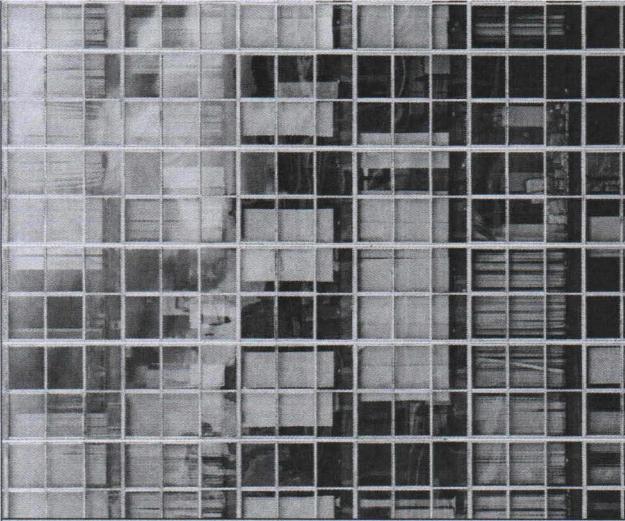
FINANCIAL OUTCOMES
Potential partnerships

POLY
HACK

There are multiple ways a need can be met, or problem solved. Start with each team member placing their ideas on the board. Include your original idea but go beyond it to explore other ways this problem could be solved. Discuss key takeaways from this exercise and how your ideas inform your solution design. Select one idea you think might have the most potential. If you select your original idea, make sure to include any adjustments this exercise has inspired.

Discuss your various solution options in light of the three outcomes and select a solution idea that you believe will best deliver those outcomes.

MISSING DATA



<p>01 Engagement Ask yourself if you have a holistic view of the need for your solution and deep understanding of your target segments. Are you engaging with all key stakeholders? Are you able to triangulate information from multiple sources?</p>	<p>02 Data Sources Continue to search online for credible data sources needed to understand the scope, urgency, and trends associated with the need/problem you are working on. Identify additional data sources to answer new questions as they arise.</p> <p>yes,</p> <p>44 A</p> <p>T4L</p> <p>One Bus Away</p>	<p>03 Missing Data Checklist Make a list of questions or missing data points. Keep adding to that list as new questions emerge.</p> <p>How many users? Reliability? Accuracy?</p>
POLYMIT HACIK	Data inventory Our decisions are only as good as the information we have available to us. Take stock of your data and sources of information. Discuss the three topics above. Make notes.	You will require a lot of information to make effective decisions to design a solution that can meet your users' urgent needs. Make a list of questions or missing data points. Keep adding to that list as new questions emerge. Keep an active log of your data needs.

THEORY OF CHANGE

Your Theory of Change Statement must capture your desired impact and the way you will achieve it.

If we create a public transportation app that includes a live walking service, then public transportation will be a pleasure to use ~~will happen.~~

Hake public transport a pleasure to use

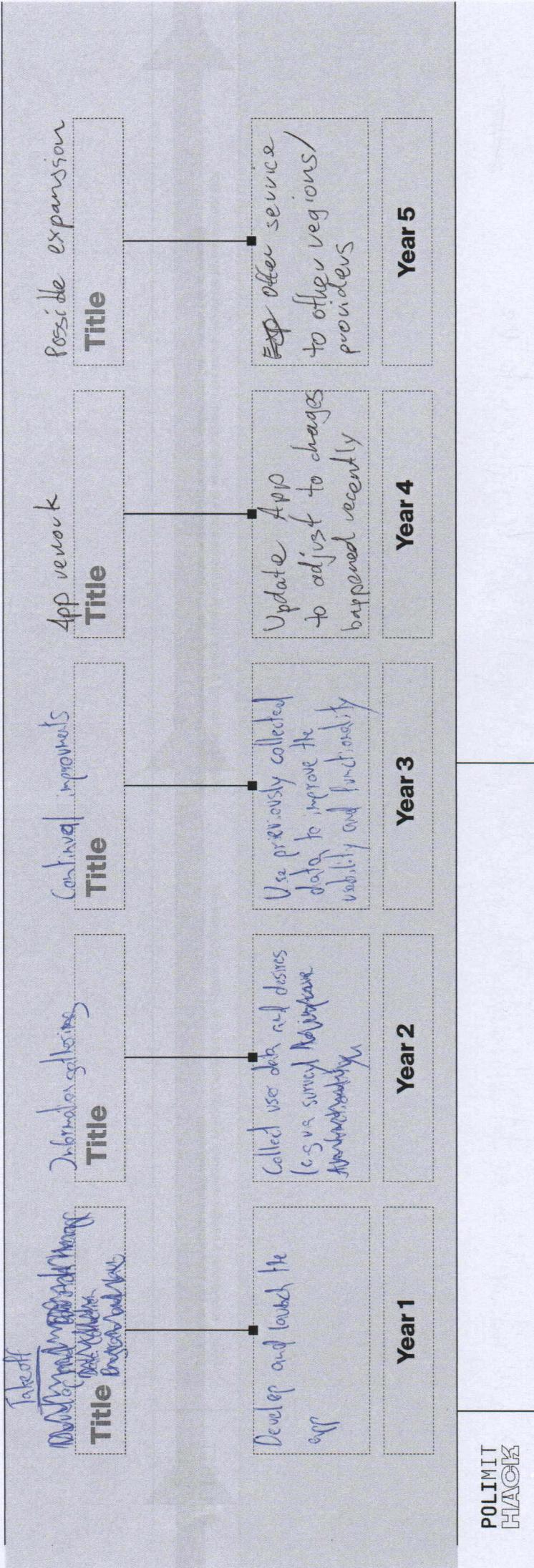
MISSION

VISION

POLIMIT HACIK Mission is functional. A mission statement describes what you do to achieve your goals and aspirations. I.e., what you do to fulfill your vision.

Vision is aspirational. A vision statement defines what you want to achieve in the future. Revisit the human and societal outcomes you defined in template 2.1.1. Make multiple drafts of your statement. Test. Iterate. Edit as needed.

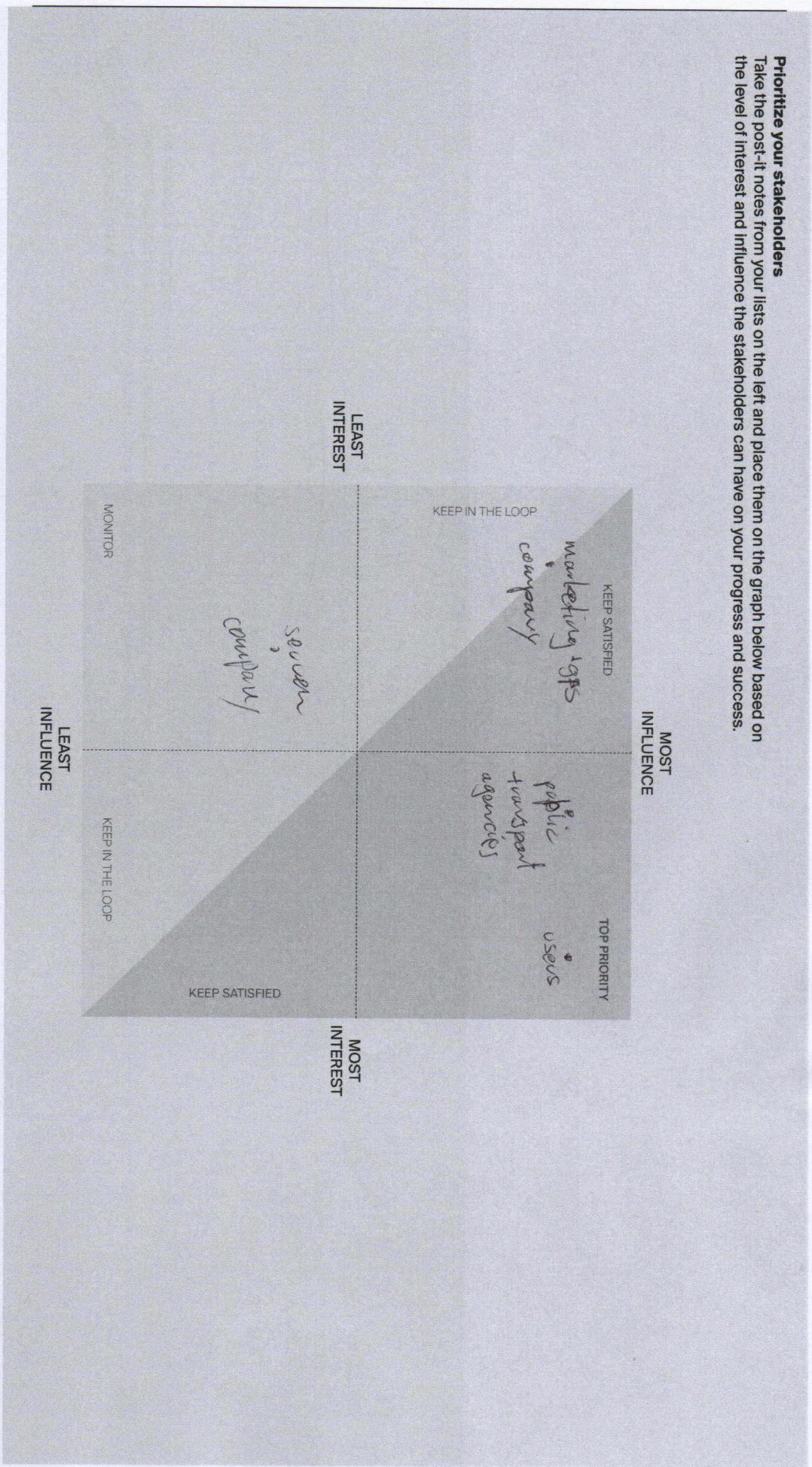
STRATEGY ROADMAP



MAPPING

Prioritize your stakeholders

Take the post-it notes from your lists on the left and place them on the graph below based on the level of interest and influence the stakeholders can have on your progress and success.



SWOT POSITION

01

Direct vs Indirect
Start by listing all the direct and Indirect ways your users are currently fulfilling their need/ solving their problem (competition).

Direct

svetlivnobilis indirect
delay notifications

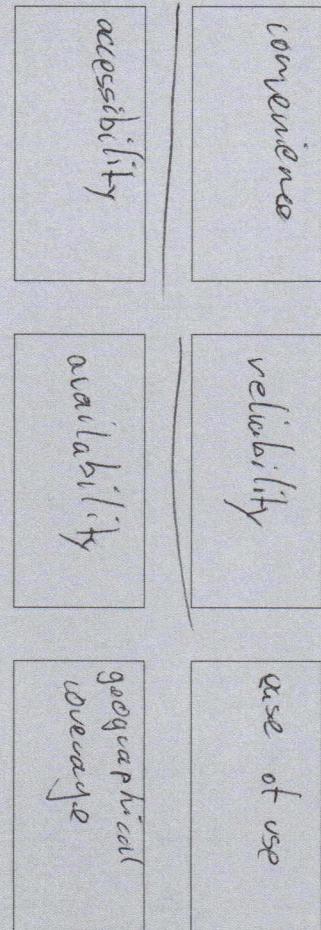
google maps data

Indirect

physical time tables
They don't

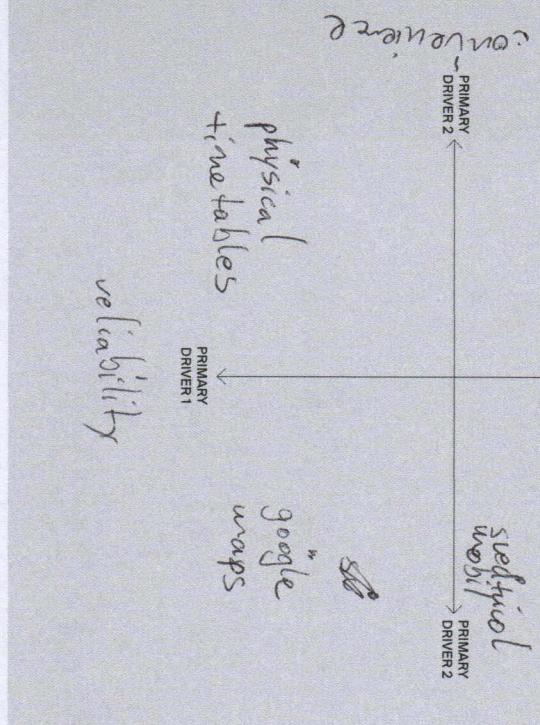
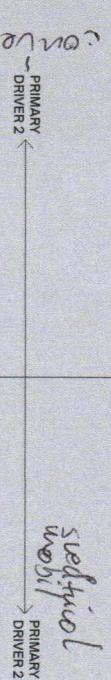
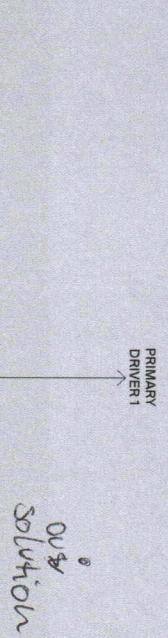
Key Market Drivers

Based on the list derived above, identify up to 6 market drivers (e.g., quality, speed, cost, etc.). Discuss, and then select the two primary drivers you believe affect users' decision-making when selecting a solution.



02

Market Positioning
Label the two axes. Each of the axis represent the two primary market drivers you just identified. Each end of the axis represents the strength (up/right) or weakness (down/left) of that driver. Place the direct/indirect competitors on the chart based on their strength or weakness. Your solution should be in a position of strength on both axes (upper right corner).



SOLUTION & IMPACT

The solution to the existing problem is the development of a tracking service for public transport. We expect this to have a major impact on the ~~whole~~^{Horizontal red} waiting time of the users of public transportation.

PROBLEM & STAKEHOLDERS

Problem:

- Already existing app from the public transportation company of Rotterdam (STA)

Stakeholder:

- GPS Company
- Data Service Company
- Marketing Company
- Users
- Public transport agencies

CONCEPT STATEMENT

Name of the concept

City Sweety Pulse

Is the only

Specify category of service
public transport app

That

Main purpose of the service
tracks transport

For

Main stakeholders of the service
commuters

POLIMIT
HACK

CONCEPT STATEMENT

Member 1	Member 2	Member 3	Member 4
<p>Best Idea 1 Make contacts for cheap GPS-Tracking, IT firms, marketing</p> <p>Best Idea 2 Make it app as simple as possible</p>	<p>Best Idea 1 Find cheapest hardware to do the job Find public transport companies (+ partner up with)</p> <p>Best Idea 2 To convince the biggest competitor to integrate our function in the app</p>	<p>Best Idea 1 Bring up the idea in general the beginning</p> <p>Best Idea 2</p>	<p>Best Idea 1</p> <p>Best Idea 2</p>

CUSTOMER JOURNEY

Steps	Search-Phase	Advertisement	Trying out app	Usage	Works good	:-)
Actions	Lacks bus.	Seeks for alternatives	Sees our ad	Installs app	Uses App	Never gets late, Happy :-)
Touchpoints	Ad	App Store	App			
POLIMIT HACK						

COMPETITIVE ANALYSIS

COMPETITOR PATTERNS

01 Who pays? Transport agency	02 How do they pay? (Preferred) money preferably	03 What do they pay for? Their buses appear in app	04 How much do they pay? ?	05 Do they have recurring avenue? Maybe	06 Notes direct and indirect competitor: Indirect: Google Maps	POLIMI HACK	Discuss the questions above and write your findings in the spaces provided. Work for the first 5 minutes by yourself. Use different post-it colors for each team member and place your post-its on the wall/board.	Then work as a team. Discuss your individual notes and agree on key findings. Discuss the needs and what drives demand for an urgent solution.
---	---	--	--------------------------------------	---	---	-----------------------	--	--

REVENUE

01

Source

List all sources of revenue
(Where does your revenue come from?)

Province
Transportation agency
Ads

02

Classification

Split the sources of revenue into transactional (one time) and recurring
revenue streams

Transactional Revenue
Initial sponsoring
Province

Recurring Revenue

Ads
Transp. agency

PROTOTYPE QUESTIONS

01 What is the most pressing question about your solution you want to test with your prototype?

If GPS-tracker and other technology works reliable

02 What is the second most pressing question about your solution you want to test with your prototype?

Will people actually use it?

03 What is the third most pressing question about your solution you want to test with your prototype?

Will a regional ad campaign be possible?

POLIMIT
HACK

Identify risks and uncertainties
Formulate questions to reduce risk
Answer questions quickly and cheaply
Start with focused questions, then move to comprehensive

Notes

POLIMIT HACK

ON VALUE

01

Value Proposition

Describe your value proposition by highlighting why/how/what drives your users/customers to your solutions.

Value Proposition plays a key role in stakeholders' decision to engage, use, or buy your solution. It governs how you design and build your solution as well as how you communicate its value.

Why

[A bold headline]

Conquer planning made easy

How

[Subheading with a more detailed explanation of the benefits and how they can get it!]

GPS based tracking delivers
real time information

What

[3-4 bulletts listing key features that make your solution uniquely valuable]

- real time data
- no existing alternatives
- reliable
- valuable data

02

Visuals

Use visuals (photos, graphics, videos) to enhance the clarity of your message.

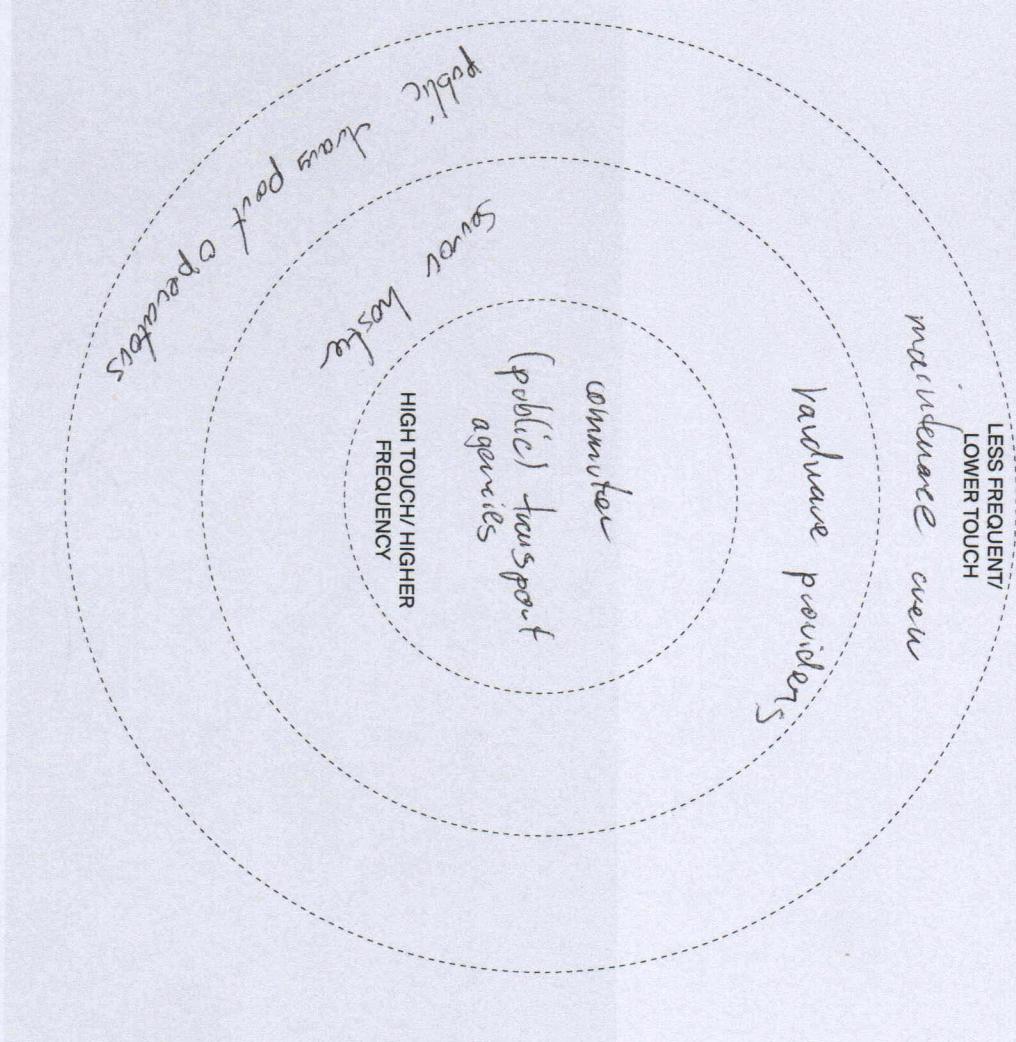
Visuals

[Insert a compelling images supporting your arguments]

Your bus



MAPPING



PITCH OBJECTIVES



<p>01 What do you need/want to accomplish with your pitch?</p> <p>Show why our project is important to our regional society</p>	<p>02 Who is in the audience and what do they need to know/understand after your pitch?</p> <p>Understand the problem Understand the solution to the existing problem</p>	<p>03 What do you want them to think after your presentation?</p> <p>To see, that such a clear solution can exist</p>	<p>04 What do you want them to feel during your presentation?</p> <p>Focused Curious</p>	<p>05 What do you want them to do after your presentation?</p> <p>Support our project!</p>
--	--	--	---	---

Photo by Debra Dierstein

Pitching can be challenging; however, constructing or using a carefully curated content will result in a more powerful pitch. The design of your pitch deck along with a compelling story will help you make a positive impression on your audience.

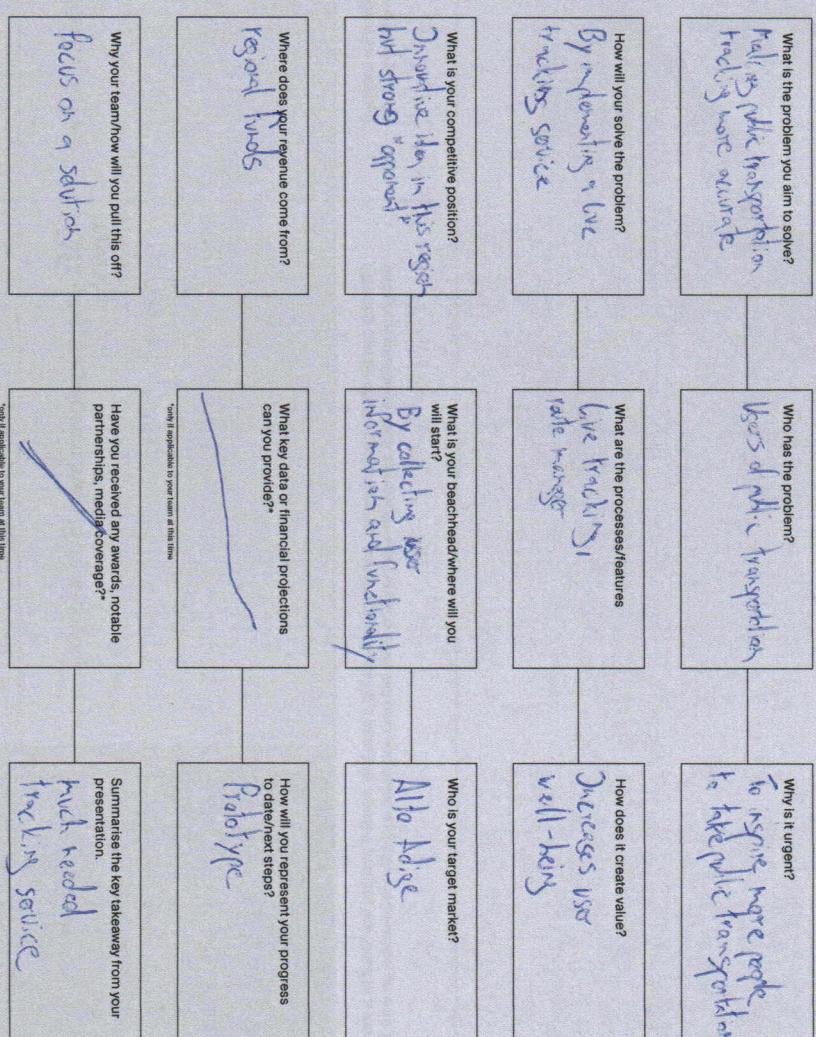
STORYLINE

01 Work individually

Start working individually. Each team member writes one sentence for each of the topics outlined in the template. This single sentence should capture the key takeaway from each slide. In one short sentence, state what you need the audience to know/feel/think/do after seeing the slide. In other words, it should be the "punchline" for each slide presented as a strong headline for each slide.

02 Discuss and select

Once everyone has placed their sentence on the board, discuss each of your sentences and select the one that best captures the key takeaway for each slide. You can also create a new sentence that includes the best ideas from your individual sentences.



USER ENGAGEMENT



Photo by Lisa Goldas

01 Who will you interview?	02 Where can you find them?	03 When will you interview them?
Public transportation users (daily/weekly...)	Near public transport	Already done
04 What questions do you need to ask?		
	Is there a need to track public transportation? Would you benefit from a tracking service/function?	

POLYMIT
HACK

Define how you will engage directly with the actual people who have the need/problem or are impacted by it. What questions do you ask, what observations will you make, whom will you talk to, where and when will you conduct the interviews/observations.

Steve Jobs said: "You have to be so close to your customers that you know their needs before they do." Discuss and outline how you will manage your user engagement throughout your time at MITdesignX.

RESEARCH PLAN

01 RESEARCH OBJECTIVE <i>Need for dynamic timetable GPS tracked buses/trains</i>	03 KEY QUESTIONS <i>How reliable public transport? How good available apps?</i>	04 HYPOTHESIS TESTING <i>People will find it unreliable, they want knowledge about where bus/train is</i>	POLIMIT HACK
--	---	---	---------------------

SECONDARY INSIGHTS

01 Datapoint + Source <i>Flat Bus Time New York Public Transport Agency</i>	02 Datapoint + Source <i>TfL (London Transport organisation)</i>	03 Datapoint + Source <i>One Bus Away</i>
04 Datapoint + Source	05 Datapoint + Source	06 Datapoint + Source
POLIMI HACKZ	Become an industry expert and gain a deep understanding of the problem/needs and the trends relevant to your venture. Collect data from industry, government, and academia.	Conduct secondary research throughout the needs analysis and beyond. Document key data points and sources. Use your secondary research to inform your primary research.

INTERVIEW INSIGHTS

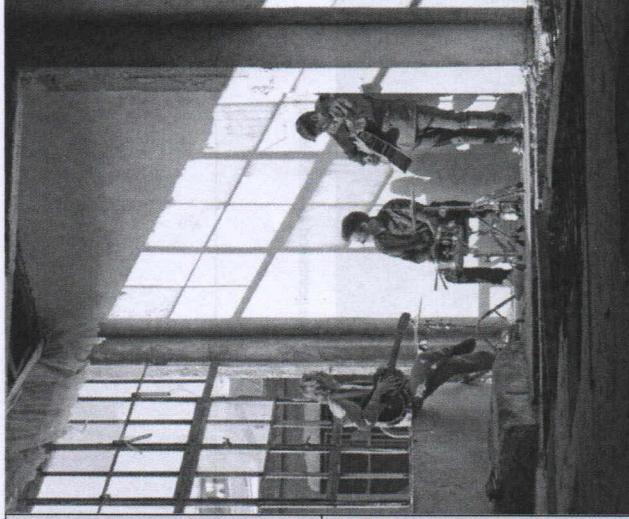


Photo by Sebastianos

01 Insight
People are unhappy with the
reliability of public transportation

02 Insight
People are rating "satisfaction" only
6.66 / 10

03 Insight
The need for a tracking service
is really high

04 Follow-up. How. Who. When.
Provide information to consumers now.

Look at the themes emerging from your interview, what did you learn? what are the key take aways for your understanding of the need/problem? Identify at least three insights but feel free to add as many as needed.

POLIMIT
HACKZ

Organize your thoughts and decide next steps, discuss, what you need to know more about. What will you follow up on? Who?

When?

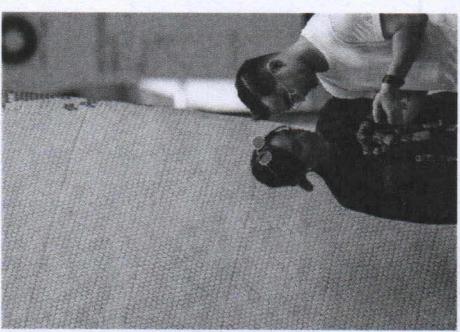


Photo by Ralph Rabeago

ROOT CAUSE ANALYSIS

Summarize the problem you identified in one short sentence here

The problem is that public transport is too unreliable.

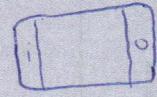
POLIMIT	HACK	Buses come late	Why People don't know when buses are coming	Why Traffic, weather, holidays makes it difficult to plan	Why Static timetables unreliable	Why People don't have a reliable way to look where bus is
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POLIMIT First work individually and ask yourself "why" is the problem a problem. What is the underlying cause?
Dig deep for the root cause of the problem through multiple iterations.
HACK

In order to get to the root cause of the need/problem, start by stating the problem in one simple sentence.
Then ask the question "why?" at least 5 times to uncover reasons for why the need/problem exists.
Place your answer in the boxes provided above.

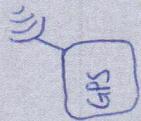
TRENDS

MARKET



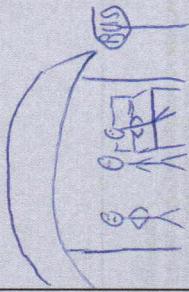
Visualize and/or write here

TECHNOLOGY



Visualize and/or write here

SOCIETY



Visualize and/or write here

POLIMIT
HACK

STATEMENT

01

Needs/Problem Statement

Start by listing the most urgent unmet needs you identified in the previous assignment “1.1.2 Needs”. Then each team member writes keywords reflecting those needs on post-it notes and places them on the board. One word per note. Discuss the words. Select and prioritize. Draft a sentence that clearly and simply describes the need/problem your solution will tackle.

Information needs to be available

To improve public transport experience

+ + Functional Needs

Copy the needs from template 1.1.2. Check if your statement captures these needs.

Need 1	<i>difficult planning</i>	<input type="checkbox"/>
Need 2	<i>No existing alternatives</i>	<input type="checkbox"/>
Need 3	<i>lack of information</i>	<input checked="" type="checkbox"/>
Need 4		<input type="checkbox"/>
Need 5		<input type="checkbox"/>

+ + Emotional Needs

Copy the needs from template 1.1.2. Check if your statement captures these needs.

Need 1	<i>inconvenience</i>	<input type="checkbox"/>
Need 2	<i>simplicity</i>	<input checked="" type="checkbox"/>
Need 3		<input type="checkbox"/>
Need 4		<input type="checkbox"/>
Need 5		<input type="checkbox"/>

02

Clarity Score

Evaluate your statement using the following criteria:

- Impactful headline

Clarifying text is:

- Short and to the point
 Focused on the problem
 States problem characteristics
 Based on facts
 Is measurable

MARKET SEGMENTS

01 Most obvious real time data	02 Most in need of your product new users pt 2.	03 Most accessible multinational migration	04 Most lucrative Subscription App
05 Most potential for growth open app (extensive)	06 Most interested in a solution volunteers	07 Able to create most impact car drivers	08 Most crazy people fleeing mental asylum
POLIMI HACK	Create eight initial market segments as starting points, each with a different focus. The most obvious is not necessarily the best. The one with the most potential might not deliver the impact you want to achieve. The most lucrative might be too small. This activity is not going to give you a clear answer, but will start the process of identifying the ideal market(s) for your solution.		

EMI

NEEDS

POLIMIT
HACK

functional and emotional needs of the key users that have the need/problem you aim to solve.

७

Functional Needs

Functional Needs
List the functional needs that drive the users you previously identified to need a solution

8

Emotional Needs

List the emotional

Emotional Needs
List the emotional needs that drive the users you previously identified to need a solution

PROBLEM FRAMING

<p>01 What is the need/problem you want to solve? Inconvenient use of public transport Difficult transportation planning</p>	<p>02 Who has the need or is affected by the problem? commuters use of public transport</p>	<p>03 What drives people to get, use, buy your product/service? information previously obtainable</p>
<p>04 Where is the problem taking place? public spaces</p>	<p>05 When does the problem need to be fixed? now?</p>	<p>06 What would be the consequences of the problem not being solved? difficult travel lose convenience possibly less public transport users</p>
<p>POLIMI HAGIK</p>	Discuss the questions above and write your findings in the spaces provided. Work for the first 5 minutes by yourself. Use different post-it colors for each team member and place your post-its on the wall/board.	
<p>Then work as a team. Discuss your individual notes and agree on key findings. Discuss the needs and what drives demand for an urgent solution.</p>		

CONNECT

TEMPLATE 2.1.3

9

Speeds

Needs
Paste your top three needs from your previous
needs analysis here

82

Problem-Solution Fit

Problem-Solution Fit
List key features that your solution must have to fulfill the need or solve the problem. Then draw lines connecting solution specifications with each of the needs. Finally, estimate the problem-solution fit on the dial above.



CRAZY 8

Crazy? I was crazy once! They locked me in a room! A rubber room! A rubber room with rats! Rats? Rats make me crazy! Crazy?

01 Live Bus Map	02 Arrival Countdown	03 Delay Alerts	04 Favorite Stops
05 Crowdness Indicator	06 Smart Route Suggestion	07 One Tap "Where's my bus?"	08 Offline Timetable Backup
POLIMIT HACK	Text		
ECI			Software

Public Transport Tracking

Problem

- Timetables often differ from actual arrival / departure times
- Finding viable transport alternatives often hard due to difficult planning
- Finding best transport option often inconvenient as for example bus might be stuck in traffic

Existing Alternatives

- Static timetables give an indication of when transport is supposed to arrive
- Announcements on train stations for train delays

Solutions

Technology

- GPS based vehicle tracking to allow for accurate position and arrival time determination

Design

- Progressive Web App to enable the widest possible User-base to have access
- Integration with existing public transport apps to ease usability

Ethics / Social

- Improved public transport experience



Key Metrics

- Usercount
- Support Tickets / Communication
- Complaints

Unique Value Propositions

- Public Transport Users + Advanced and Dynamic Information + Convenient and Easy to Use Design = Dynamic Timetables for travelers

High Level Concept

- Public transport tracking for everyone

Unfair Advantage

- Unique Data
 - Proprietary GPS trackers
 - Proprietary usage tracking (via App)
- User habits
 - If merged with suedtirolmobil, users won't switch to alternatives

Customer Segments

- Users
 - The average Joe trying to use public transport
 - The general public
- Customers
 - Public transport providers
 - Private transport companies

Early Adopters

- Ideal customer
 - Willing to invest in hardware and software to make the project possible
 - Willing to offer time for us to test and improve solution
 - Willing to pay for the software maintenance and upkeep post initial install
 - Interested in our solution to provide improved service to users

Channels

- First awareness
 - Physical advertisements at bus / train stops
 - Posters in / around public transport
 - Homepage
 - Word of mouth
- Access interface or prototype
 - Mobile phones
 - Desktop webpage
 - Homepage link
- Continuos learning and feedback
 - In-App notifications
 - Push notifications
 - Email Feedback poc
 - WhatsApp Business Contact

Cost Structure

- Hardware
 - GPS trackers
 - Server infrastructure
- Development costs
 - Feature updates
 - Bugfixes
 - QoL improvements
- Running costs
 - Power bills
 - Labor
 - Device installation
 - Maintenance

Revenue Streams

- indirect revenue
 - no revenue from users (like suedtirolmobil)
 - possible financing and support by
 - the province (or trough suedtirolmobil)
 - the users (e.g donations or data for useful statistics in exchange for privacy)
 - partners (possible ads)
- high non-monetary value for users
 - significant support for public infrastructure
 - high benefit for users trough live tracking
 - better time management trough main functionality and high usability
 - in general, high functional, social and (partially) emotional value
 - well-being because of a trustworthy and local service
 - only userdata for statistics and improvements which (user gets informed and must consent)

