



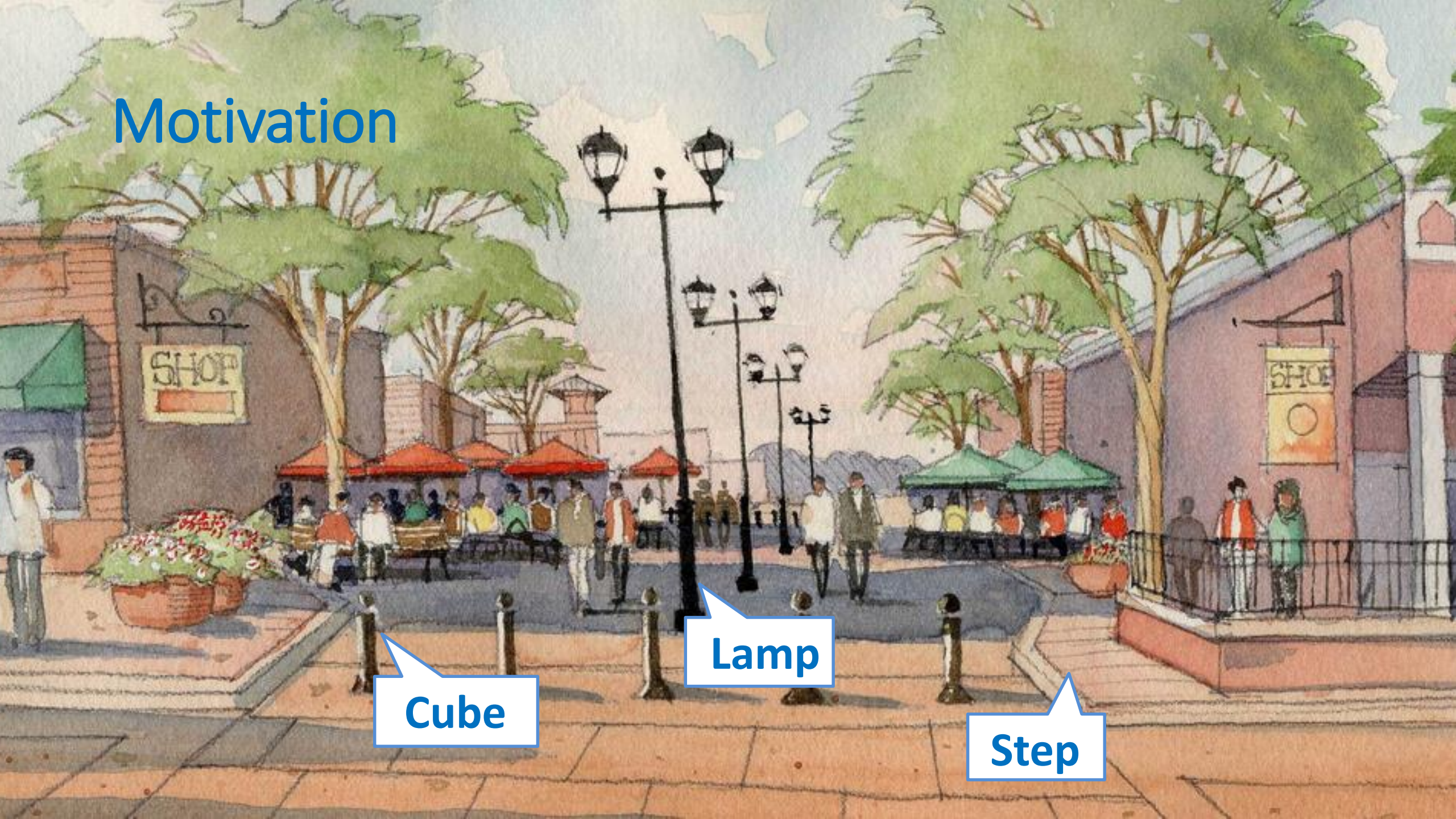
Navigation Infrastructure for People with Disabilities

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Petrozavodsk State University



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April 18-22, St.-Petersburg, Russia

Motivation



Cube

Lamp

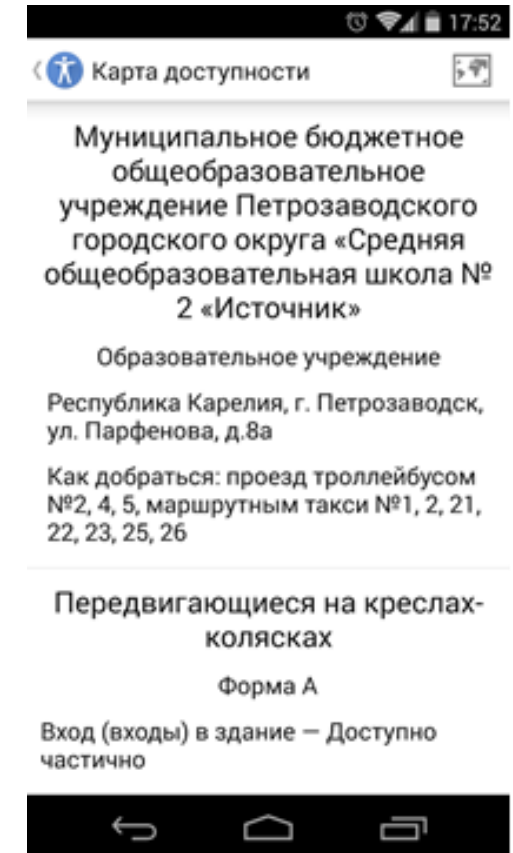
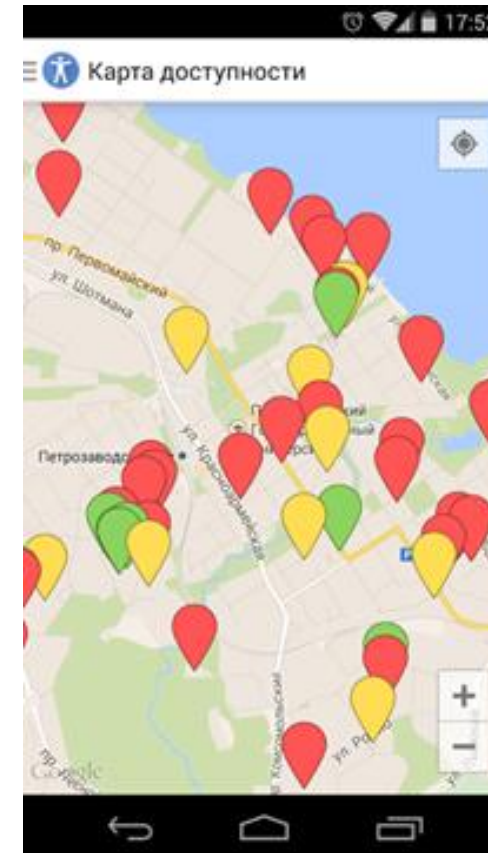
Step



Social Navigator



Navigation service for people with disabilities



Accessibility map Accessibility Passport



Road Graph

Services

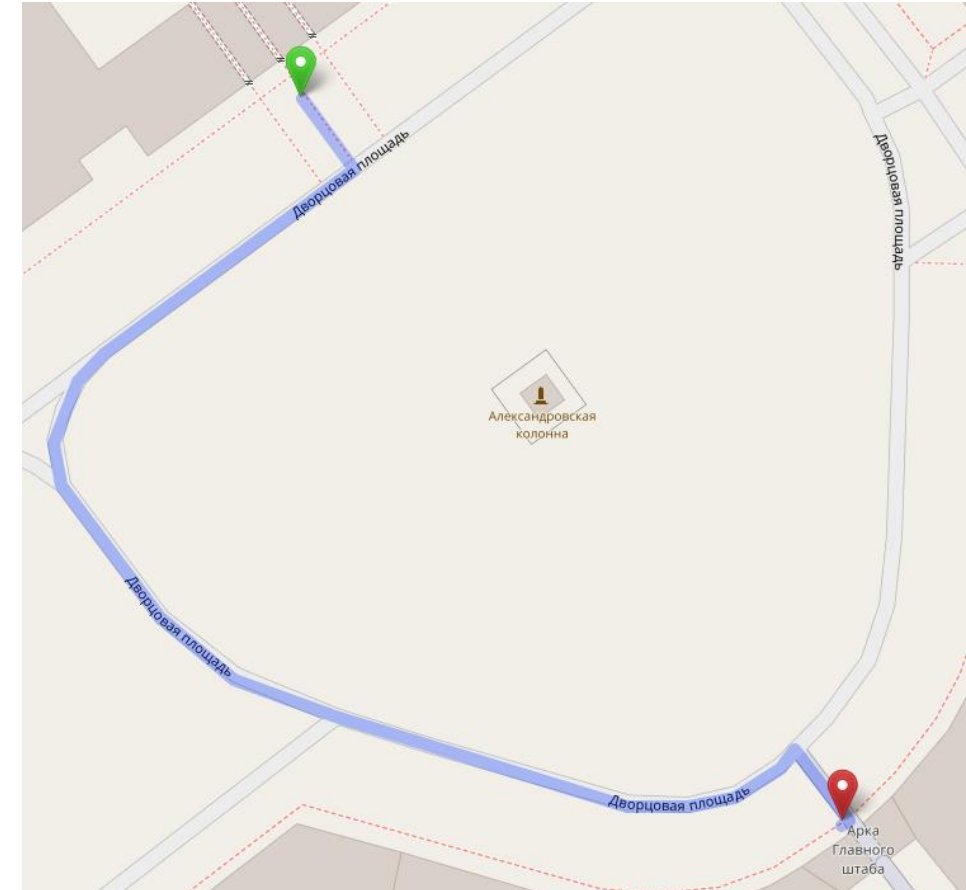
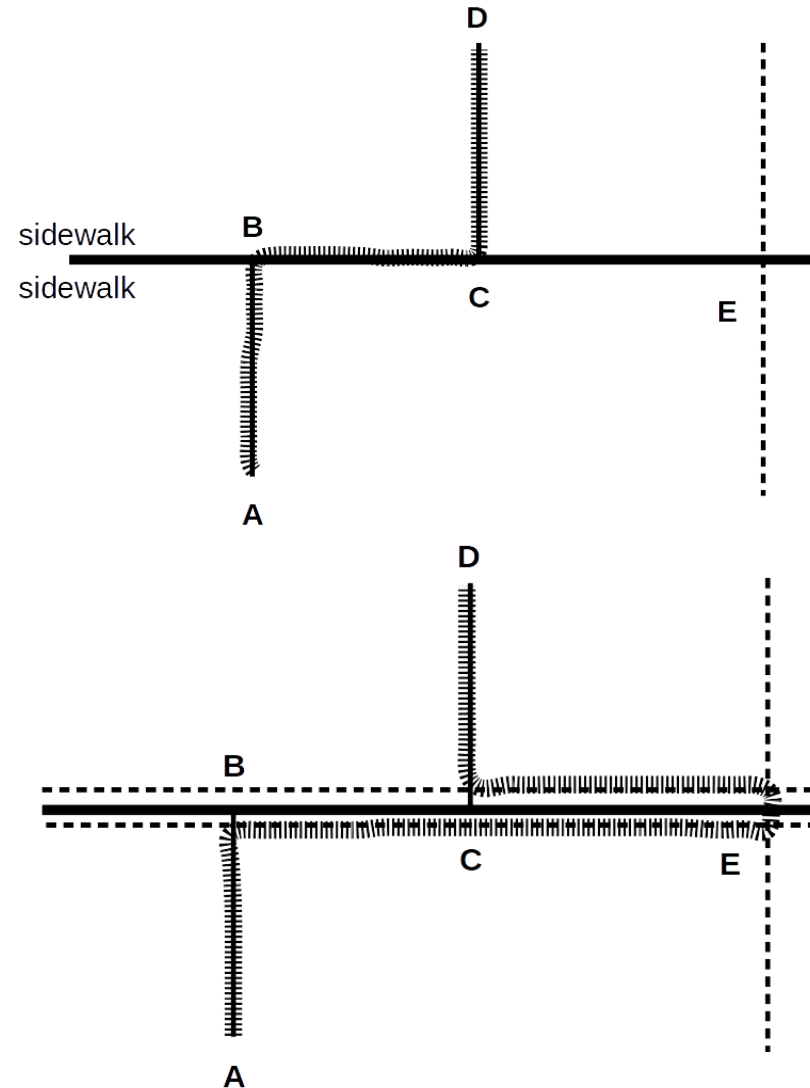
- The Google Directions API
- JavaScript API Yandex.Map
- API 2GIS
- **Openstreetmap with GraphHopper**

Road categories

- Residential highway
- Service highway
- Living street
- Pedestrian-only
- Footway
- Steps
- General path

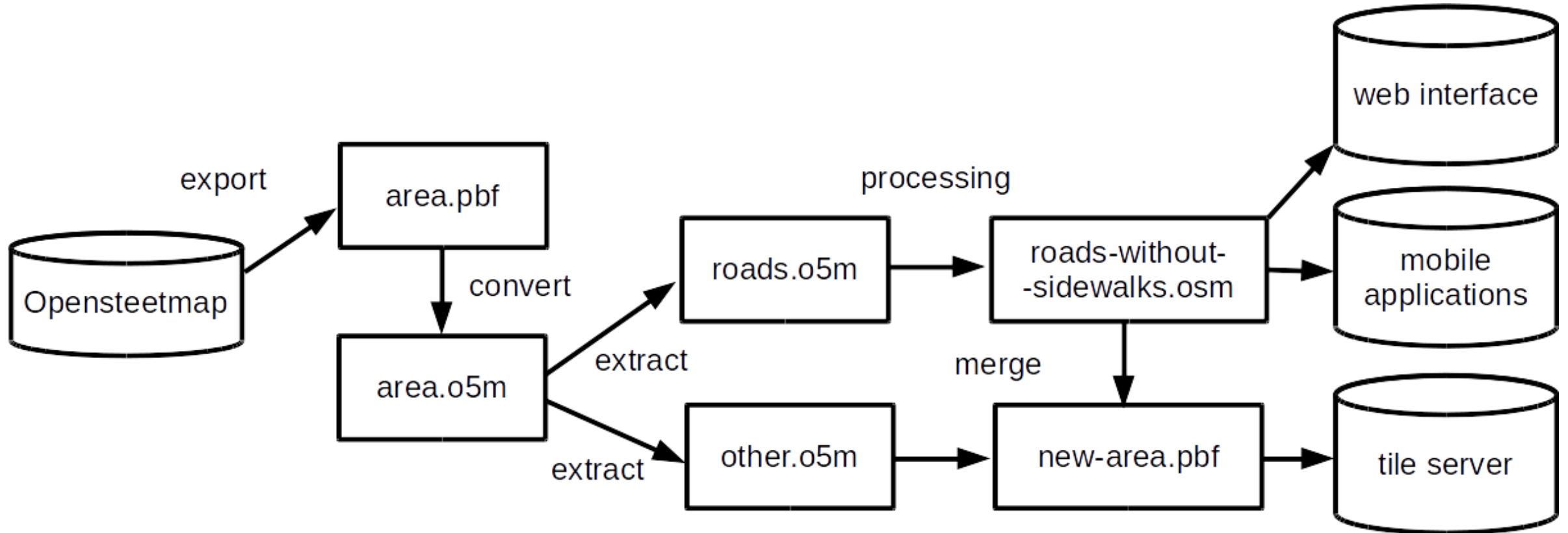


Sidewalks and squares





Openstreetmap data transformation





Route Obstacles

Categories of Disabilities



Moving on a wheelchair persons



Persons with hearing impairments



Persons with visual impairments



Persons with impaired musculoskeletal system



Persons with impaired mental development

Types of Obstacles

- High curb
- Stairs without ramps
- Unregulated pedestrian crossing
- Various pits and bumps in the road
- Stairs with ramps
- Adjustable pedestrian crossing
- Steep climbs and descents
- Object on the road
- Narrowing of the road



Complexity Coefficients for Different Types of Disability

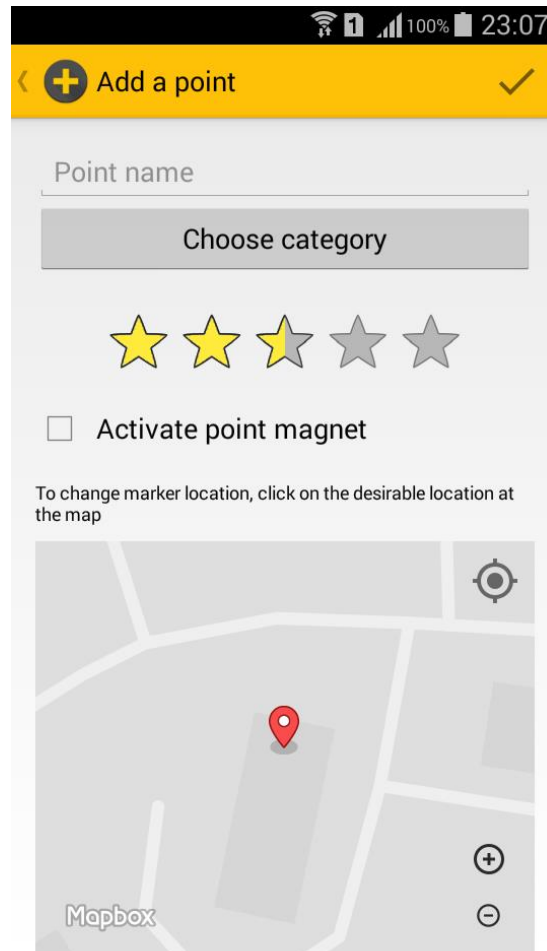


1. Independent movement
2. Independent movement difficult
3. Independent movement requires preparation
4. Moving only with assistance
5. Insurmountable obstacle

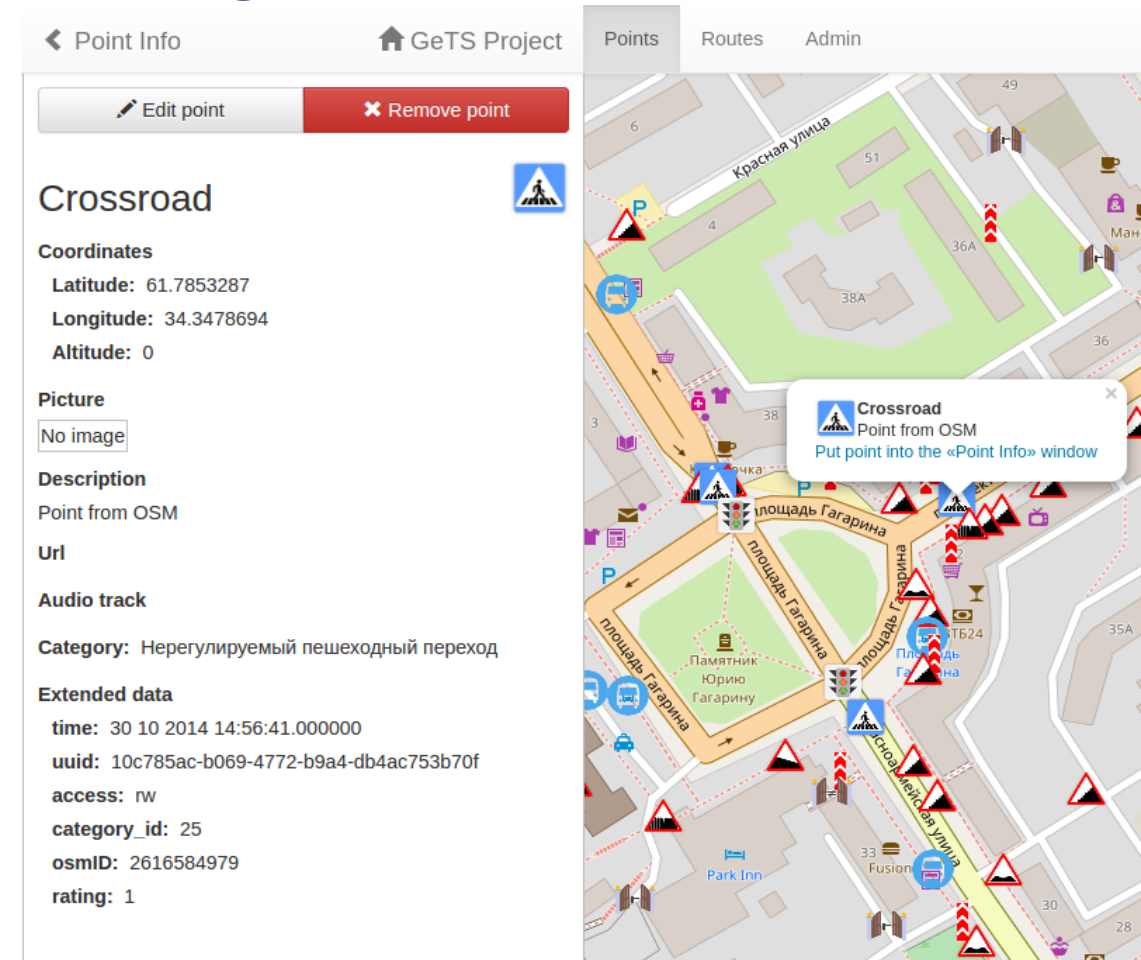


GeTS Supplement

Obtaining obstacles on the ground



Editing and refinement





Route Constructing Algorithm

- Dijkstra-based algorithm on GraphHopper routing engine
- Properties:
 - Road type
 - Category of disability
 - Number of obstacles on the road
- Three types of routes:
 - Save route (obstacle less than 1 or equal)
 - Moderately dangerous route (obstacle less than 5)
 - Fast route (shortest path)



Social Navigator at Pilot Zone

GeTS Web Client

gets.cs.petsru.ru/obstacle/web-client/dist/routes.php?lang=en#form=route_info&route_type=

Search

Track Info GeTS Project Points Routes Admin ka432user3@gmail.com English / English

0.935 km 0.884 km

Cost: 46

Obstacles:

- Лестницы
- Препяствие на дорог
- Лестница
- Препяствие на дороге
- Клумба у памятника Анохина
- Прямомк
- Traffic light
- Crossroad

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Track Info | GeTS Project | Points | Routes | Admin

ka432user3@gmail.com | English / English

Cost: 0.935 km | 0.884 km

33

Obstacles:

- Препяствие на дороге
- Crossroad
- Traffic light
- Crossroad
- Crossroad
- Ступень
- Бардюр пешеходный переход
- Ступень

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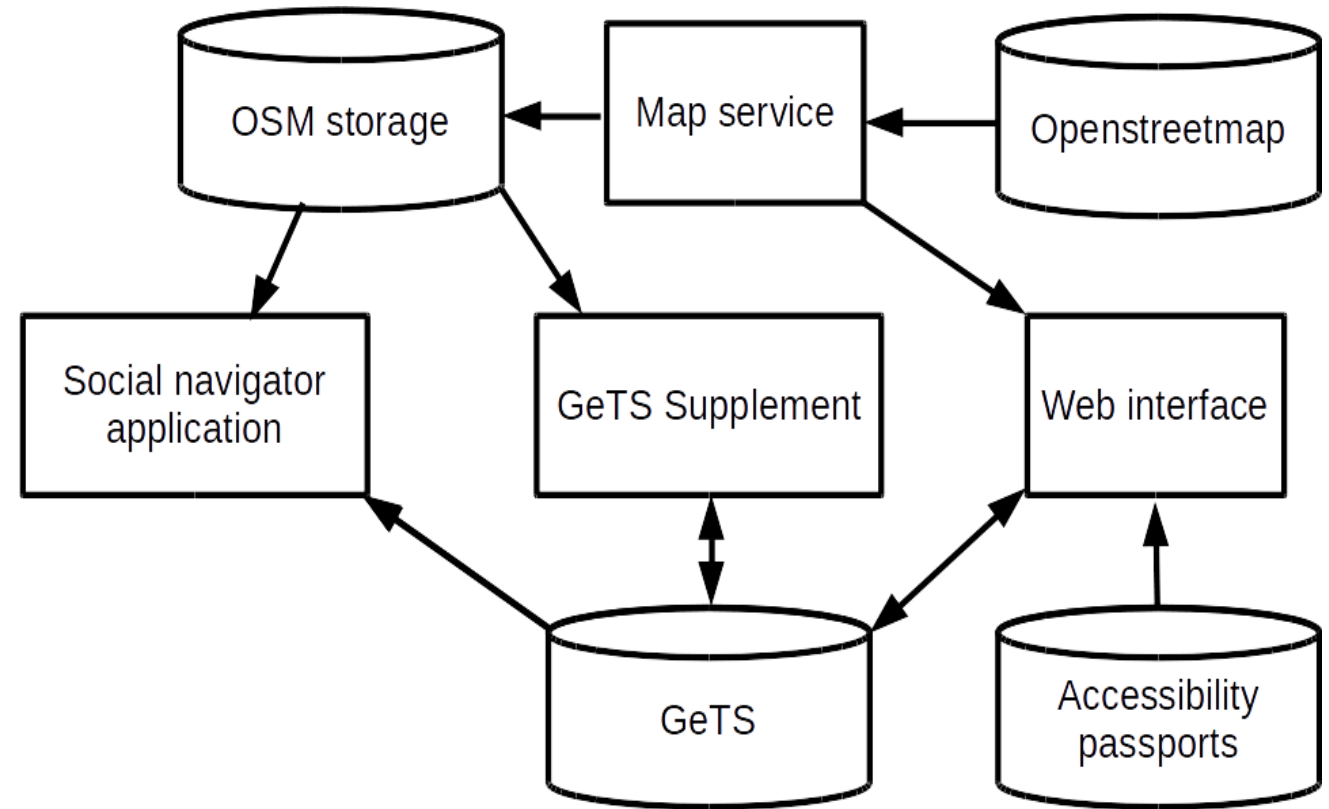


Social navigator project

Produce routing information and navigation sources

Obtain information about obstacles

Build routes used routing information and obstacles rating for selected type of disability



Thanks for Attention!

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