Staying Indoors

OSM indoor maps for KDE Itinerary

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Outdoor Maps

- Good to get you to a building
- Struggle inside complex multi-floor buildings such as railway stations or airports
- You’d still want a map in those places though
- Floor level separation missing
- Floor changes are a particular accessibility challenge
OSM Indoor Data

- OSM data model has support for this
  - level=* - simple number or number range
  - indoor=* - detailed room-level mapping

- Data quality varies
  - Showcase buildings
  - Train stations in a number of countries
Floor Level Separation

- The easy case: level=1
- Stairs: level=0;1
- Sub-floor resolution: level=0;0.5
- Elevators: level=-2-4
- Indirect information: building:levels=5
- Filter to publicly accessible/relevant floors
Floor Level Data Issues
Map Rendering

- Only few scene graph primitives
- Label placement
- Most complexity is in rules for:
  - Z-order
  - Overlap priorities
  - Colors, fill and stoke patterns
MapCSS

- Declarative styling rules for map content

```css
way[railway=rail] {
    color: #eff0f1;
    dashes: 2,2;
    width: gauge;
    casing-width: 3px;
    casing-color: #31363b;
    linecap: none;
}
```
KOSMIndoorMap

- Library and QML component
- Consumes Marble’s OSM raw data tiles
- Floor level separation, inter-floor navigation
- Live MapCSS evaluation
- Higher-level semantic analysis of OSM data
- Integration of other (live) data sources
Implementation Details

- MapCSS engine is used both for styling and content filtering
- Basic scene graph independent of the rendering
- Q Painter-based 2D renderer
- Supports re-colored SVG icons
- Geometry re-assembly from Marble’s tiles
Performance
Semantic Analysis

- Escalators, elevators
- Airport gates
- Railways platforms and public transport stops
- Opening hours
External Live Data

- Escalator/elevator status by accessibility.cloud
- Rental bike/scooter positions from GBFS feeds
Navigation Challenges

- Indoor localization
  - No or poor GPS reception
  - Vertical position matters

- Indoor routing
  - Incomplete data
  - Routing in polygons
  - Floor level changes
Outlook

• Goal for KDE Itinerary: in-place display of train coach positions
• Focus on train stations/airports, but there’s also good data available for museums, universities, shopping malls
• Merge with Marble?
Questions?
References

- KOSMIndoorMap: https://commits.kde.org/kosmindoormap
- KOpeningHours: https://commits.kde.org/kopeninghours
- KDE Itinerary: https://apps.kde.org/itinerary
- MapCSS: https://wiki.openstreetmap.org/wiki/MapCSS/0.2
- Opening hours: https://wiki.openstreetmap.org/wiki/Key:opening_hours
- Accessibility Cloud: https://accessibility.cloud/
- GBFS: https://github.com/NABSA/gbfs
- Marble: https://marble.kde.org