OpenStreetMap

The Free Wiki World Map

whoami

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- Student of Telematics at Graz University of Technology since 2003
- Involved in Open Source since 2004
- OpenStreetMap since July 2010
- Organising the user group Graz since May 2011
- Talks, workshops and freelance work around OpenStreetMap

What is OpenStreetMap

- OpenStreetMap (OSM) is a free world map based on the 'Wiki'-principle
  - *Technically, it's a spatial database and not a map*
- Based on the work of >1 M hobbyist cartographers "*Mappers*"
- The complete "planet file" contains 386 GB of data (xml)

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- Licence: Open Database Licence: Think of Creative Commons for Data.

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- Organisations that work with OSM Data:
  - geofabrik.de
  - MapBox
  - MapQuest
  - Skobbler
  - BikeCityGuide

History of OSM

- Start in August 2004 through *Steve Coast*
- Dec. 2006 - Yahoo allows tracing
- July 2007 - first conference “State Of The Map 2007”
- Aug. 2007 - 10,000 registered users
- Mar. 2009 - 100,000 registered users
- Jan. 2010 - 200,000 registered users - Haiti–Project
- Nov. 2010 - Bing allows tracing
- Nov. 2011 - 500,000 registered users
- Yesterday - 1,023,125 registered users

History of OSM

Exponential growth,

- 2013: 1 M

Double each 18 month:

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Double each 18 month:

- 2016: 4 M
- 2022: 64 M
- 2034: 1,024 M
- ...here it gets unrealistic — but we hope for 1/100 of the population :-)

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- We need a source for free geoDATA, not only web maps!
- We need to create maps with different styles, not the only one Google offers us!
- We want to do routing with our own algorithms
  - Bicycle routing that actually works
  - Rollerskate routing
  - Wheelchair routing

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  - Wheelchair routing
- And all of that offline, without Internet access!

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- Costs! Google charges from 25 K API calls/day onward!

Why OpenStreetMap?

Benefits of OpenStreetMap:

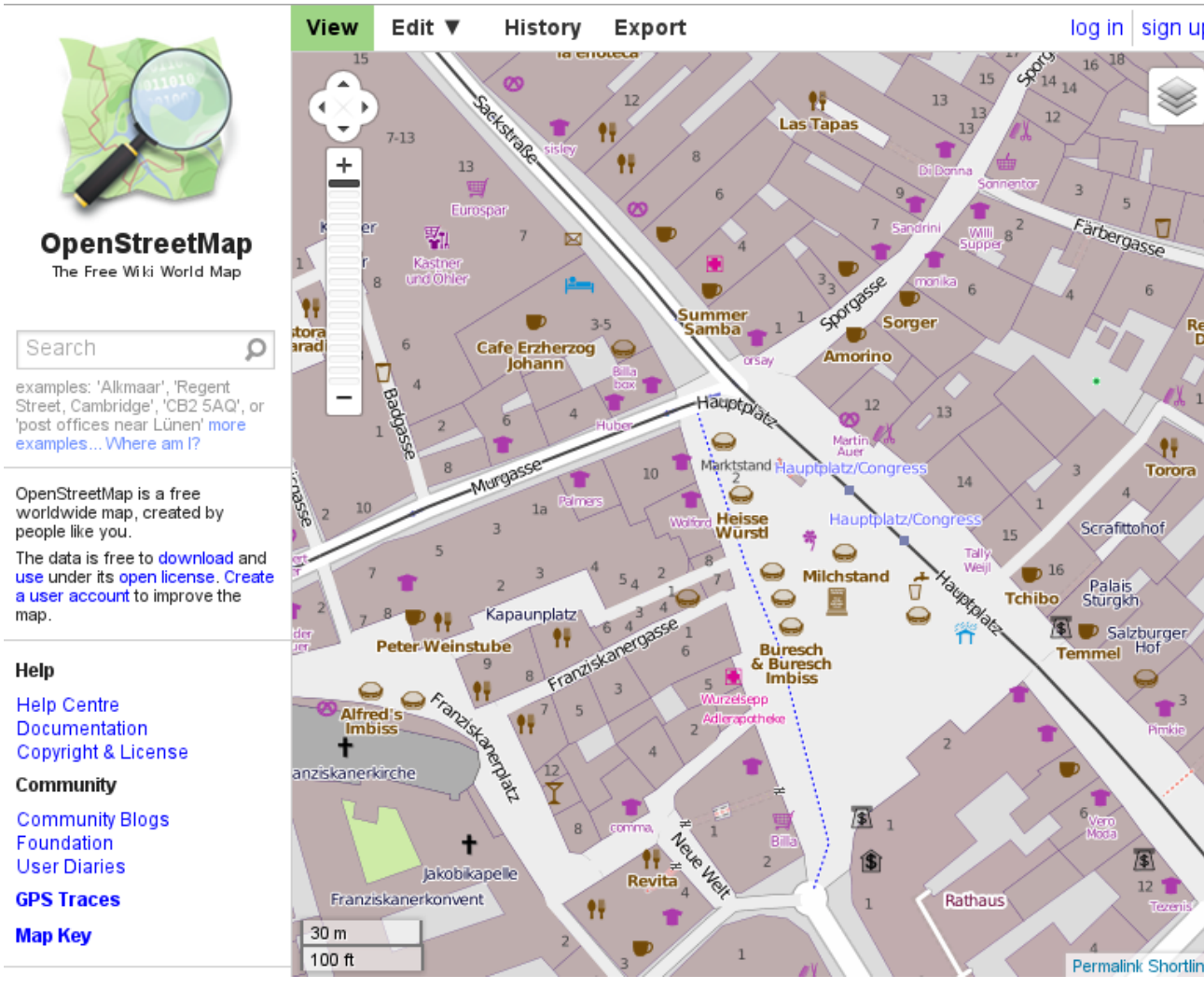
- Raw data is provided
- Everyone can improve the data (wiki-principle)
- You can get free data for your satnav

Freedom creates possibilities!

Use OSM Services Directly

www.osm.org

- Search (Nominatim)
- 4 different map styles
- View history of areas/objects
- Data display
- Edit with Potlatch (Flash)



Websites Showing Special Data

OpenStreetMap is not only about its main page, most of its value is generated through other maps generated from its data:

- OpenSeaMap
- Wheelmap
- Cuisine in Restaurants: opengastromap.de
- Smoker's Map: opengastromap.org

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- Smoker's Map: opengastromap.org
- for >200 more, see the OSM-Wiki

Routing:

- OpenRouteService.org (+pedestrian, bike with profiles)
- maps.cloudmade.com (+bike, pedestrian)
- Open Source Routing Machine car only, but VERY fast.

The whole ist of routing services based on OSM is available at http://wiki.osm.org/Routing/OnlineRouters

Mobile Apps

The future: Ubiquitous Computing!

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Apps using OpenStreetMap on:

- Android (>70) http://wiki.osm.org/Android
- iPhone (>60) http://wiki.osm.org/Apple_iOS
- Blackberry (8) http://wiki.osm.org/BlackBerry_OS

Of course, you can use OSM on your Garmin, see wiki.osm.org/Garmin!

Download OSM Data

You can use the “Download”-button on osm.org - for small areas

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I want the whole planet!

- Excerpts for download see wiki.osm.org/Planet
  - .dbf - binary file format, efficient compressed
  - .osm.xml - standard OSM format
  - ESRI Shapefile

Creating You Own Map

Its now very easy thanks to the new Overpass API. All you need is a short snipplet of JavaScript. Background and data are served from OpenStreetMap!
Some examples:

- A Maxheight Map
- A map themed around Bicycles
- Of course OSM supports Turn Restrictions!
- More sophisticated: Public Transport Map of Innsbruck
- ...
- Create your own: overpass-turbo.eu

Editing

A lot of editors are available for web, mobile and desktop use.

- Web:
  - Potlatch (Flash)
  - JOSM web-start
  - iD (JavaScript), in development
- Mobile (e.g.): full list see Android, iOS:
  - Vespucci: full-scale editor
  - osmaptuner: edit existent POIs
  - OsmTracker: GPS-Tracks, Audio, Fast POI-Add
- Desktop
  - JOSM (Java)
  - Merkaartor (C++)
  - Qgis (C++)
  - ArcGIS (commercial) in newest Version

Understanding the Data(base)

OSM is a geospatial database with three basic elements:

- Nodes: Defined through x,y coordinates 
- Ways: a string of nodes 
- Relations: A meta "Group" that can include Nodes and Ways 

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Each of these basic elements can have properties ⇒ "Tags", e.g.:

- amenity = cafe 
- highway = footway 
- building = yes 
- landuse = farmland

These properties are free textfields written as key=value pair.

Understanding the Data(base) 2.

So, what do we tag?

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So, what do we tag? Everything!

- highway=*, landuse=*, shop=*, tourism=*,
- e.g. amenity=restaurant, cuisine=pizza, smoking=no, wheelchair=yes, ...
- ?=*

Althrough free text, common standards have been worked out in the Wiki.
$\Rightarrow$ all relevant tags can be found in the Wiki!

Technical Background

There is 1 central Database (postgres/postgis) for writes (located in GB)
This DB is mirrored all over the world for reads with different methods:

- Rendering servers use a minutely updated local DB
- API read calls are load-balanced over multiple readonly servers
- Excerpts for download see wiki.osm.org/Planet
- overpass API for VERY fast SQL-like calls directly on a DB, e.g. give me all pubs in Graz

Future Possibilities

What are the possibilities of an open geo database like OSM?

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What are the possibilities of an open geo database like OSM?
Endless!
Ubiquitous computing needs to know its surroundings!

- Where am I?
- What is nearby?

$\Rightarrow$ A geospatial database is needed for Ubiquitous Computing!

What Tags in OSM are useful?

Especially people with disabilities need special routing instructions:

- Is there a tactile paving on the way
- crossings:
  - Number of lanes to cross
  - traffic_signals:sound ?
  - traffic_signals:arrow ?
  - traffic_signals:minimap ?
- surface type: asphalt, cobblestone, grass
- are there lowered kerbs?

A Routing example

E.g. A user asks his mobile assistant Siri: Where is the nearest italian restaurant?
Lets imagine Siri knows the following information:

- Where is the user? Currently in Tram 7, coordinates from Galileo.
- The user is a non-smoker.
- The user is a vegetarian.

A Routing example 2.

- Siri queries all *amenity=restaurant*,*cuisine=italian* POIs from OSM around 5 km.
- Only restaurants with the *smoking=[no|isolated]* tag are considered.
- Restaurants with the *diet:vegetarian=yes* tag are preferred.
- Parsing tag: *opening_hours=** filters out closed restaurants.
- It fetches the next *railway=tram_stop* points from the tram route from OSM, and starts to calculate the route from them to the POIs.
- It queries the *contact:phone=** information from OSM and dials the phone number to make a reservation.

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- It queries the *contact:phone=** information from OSM and dials the phone number to make a reservation.
- While on the tram, it starts raining. The route is being recalculated to include as less ways with *covered=no* set as possible.

A Today's Example

http://www.schau.auf.linz.at Every citizen can report defective road inventory, overfull waste bins and other annoyances.

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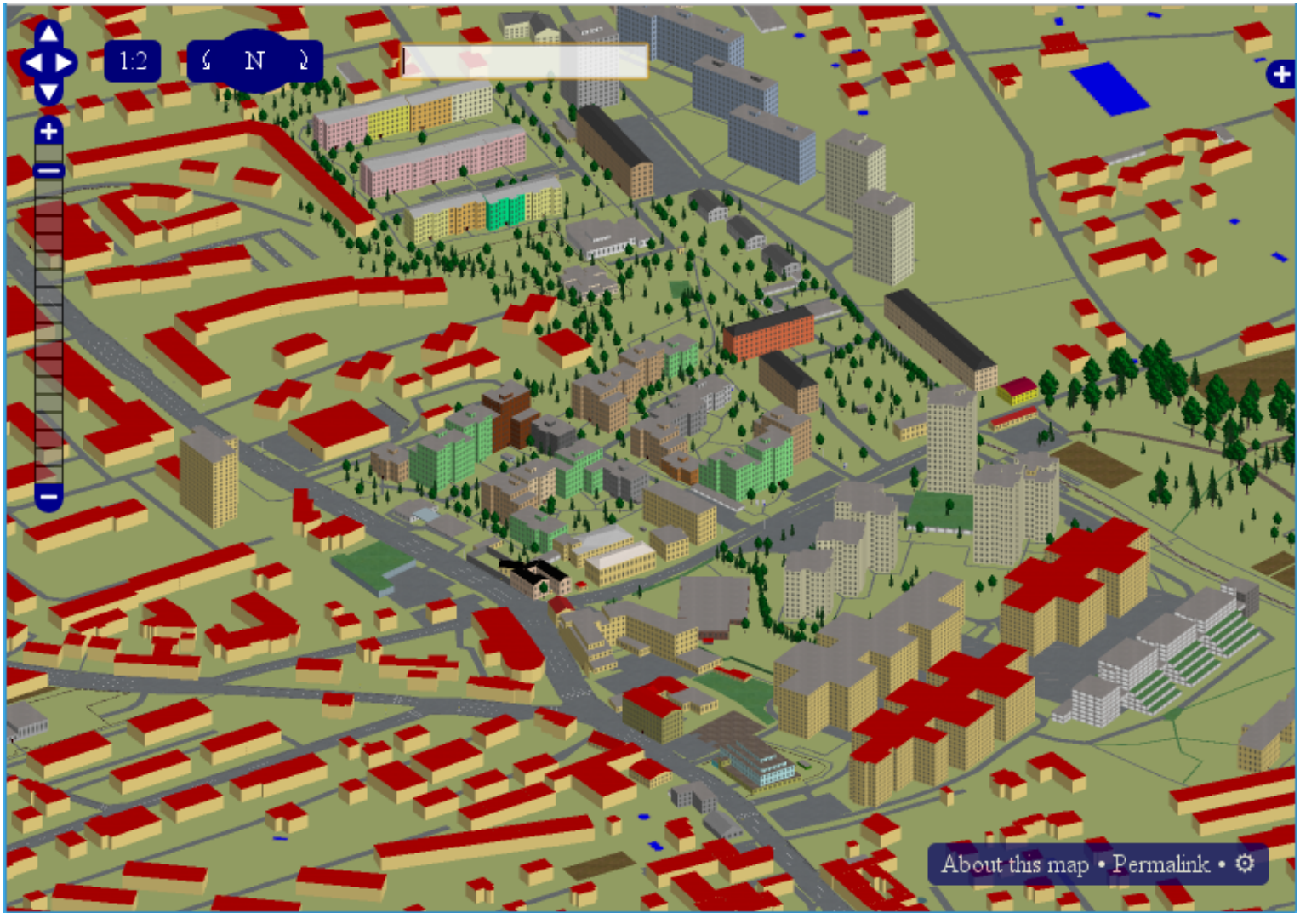
http://www.schau.auf.linz.at Every citizen can report defective road inventory, overfull waste bins and other annoyances. Possible today: routing considering highway=construction on a daily basis!

3D is the Future!

3D is coming to OSM! See example at maps.osm2world.org.



What does OSM Need in the Future?

OSM is ideal for any project where geodata is needed.
OSM coverage is better in cities than commercial data providers, but we need more data everywhere!

- Promote Open (Goverment) Data in your organisation!
  - housenumbers are most urgent for geolocation!
  - public toilets, defibrillators, tree cataster
  - poo-bags . . .
- Help OSM by fixing errors yourself

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- If it exists in your town: the local user group meeting! see Map.

The End

Slides for Intensive Program 2013 - Innovative user Interaction

License of slides:  .

Created with LaTeXBeamer, source on request.

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