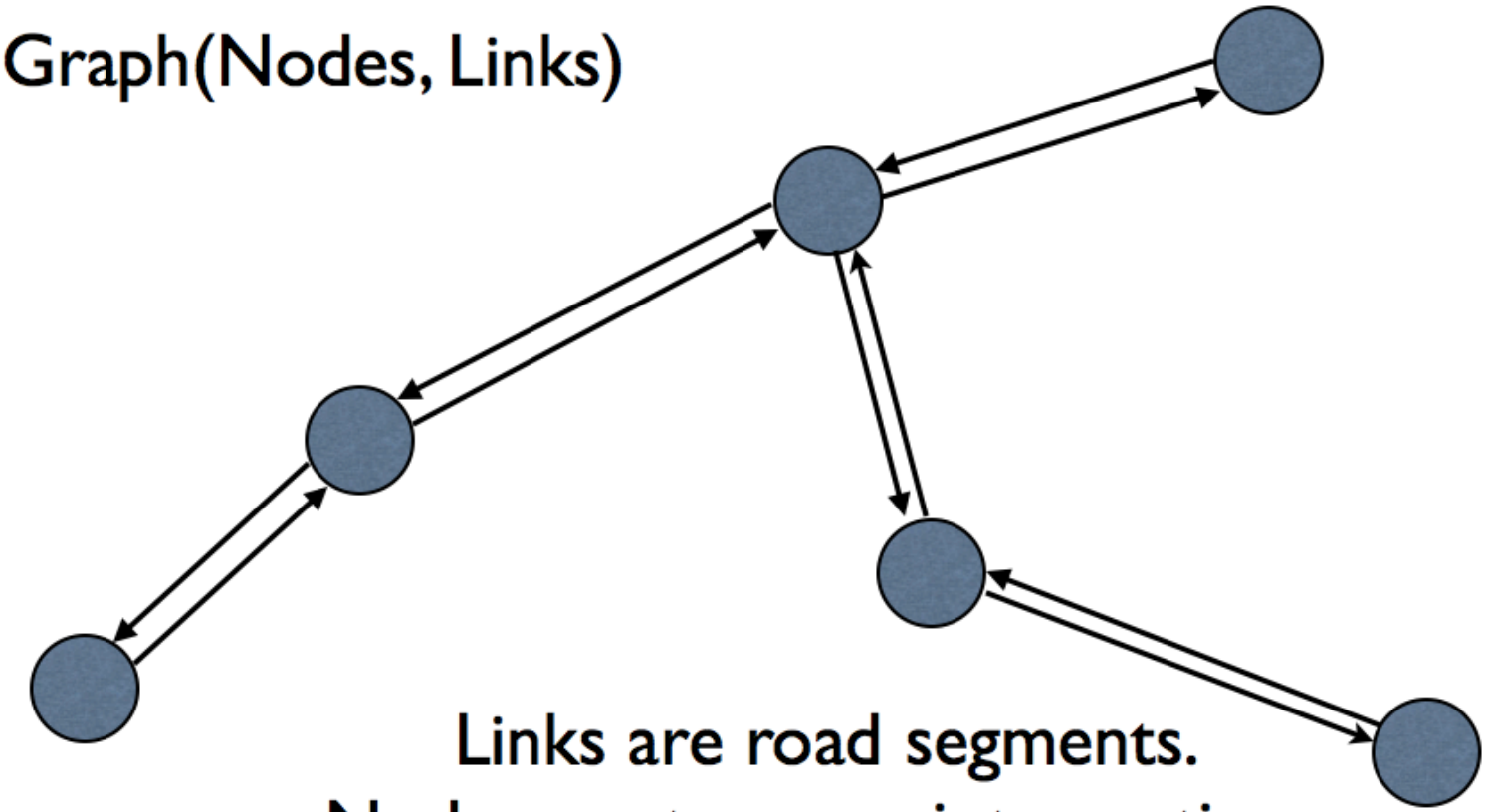
scenario.getNetwork()

Generating a traffic network model from public data


MATSim

Graph(Nodes, Links)



Links are road segments.
Nodes are turns or intersections.

```
<link
   id="38"
   from="30621384"
   to="30621385"
   length="64.61"
   freespeed="12.5"
   capacity="600.0"
   permlanes="1.0"
   modes="car" />
```

```
<link
  id="38"
  from="30621384"
  to="30621385"
  length="64.61"
  freespeed="12.5"
  capacity="600.0"
  permlanes="1.0"
  modes="car" />

<node
  id="30621384"
  x="-452302.8250842397"
  y="1.5899746090166133E7" />

<node
  id="30621385"
  x="-452267.03075036523"
  y="1.5899799881883545E7" />
```

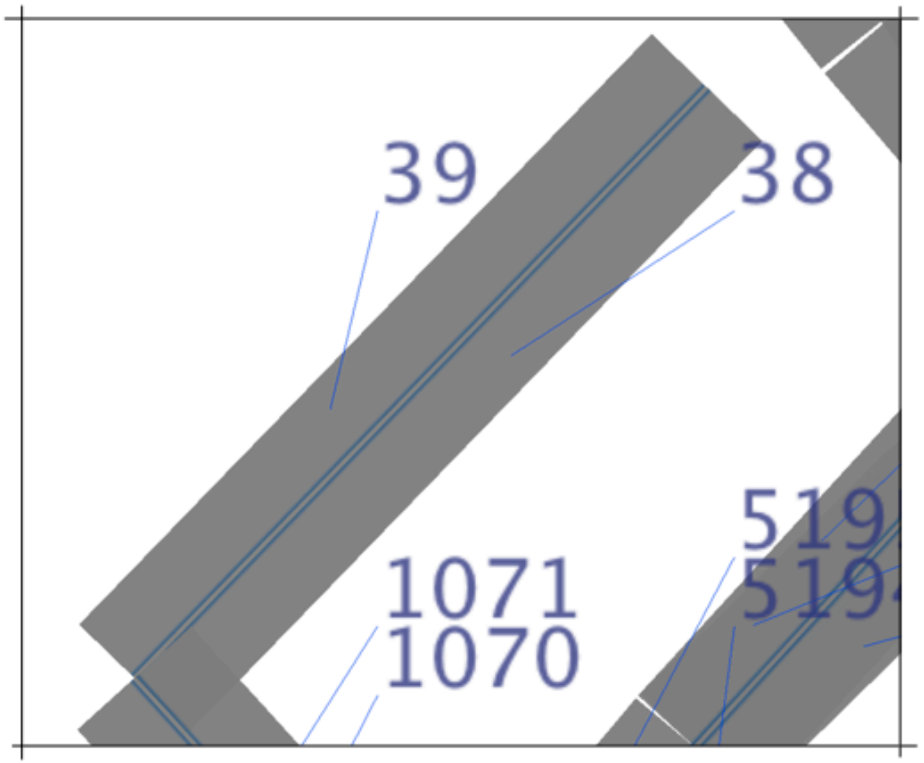
Link contains all the attributes for the mobility simulation.

Nodes contain nothing but geometry.

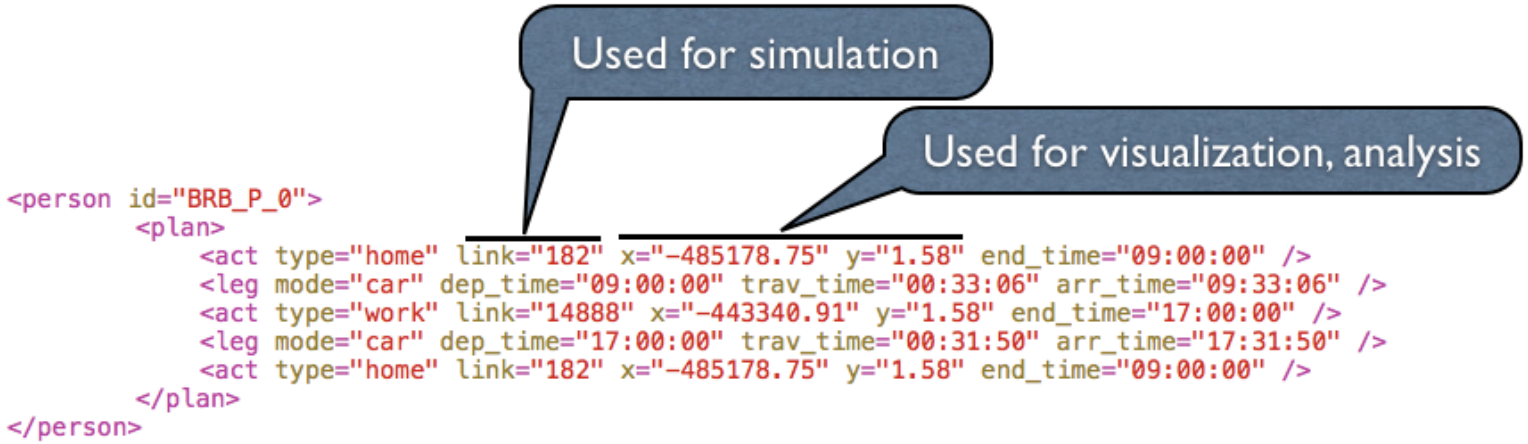
```
<link
  id="38"
  from="30621384"
  to="30621385"
  length="64.61"
  freespeed="12.5"
  capacity="600.0"
  permlanes="1.0"
  modes="car" />
```

Links are one-way.

So create two links for two-way roads.



Activity locations are attached to links.



Later.

How to get a network.xml

- Code by hand
- Convert from VISUM or OpenStreetMap
- Build it using the MATSim Java API

MATSim API is simple.

Just start with scenario.getNetwork() and explore from there.

```
private Scenario scenario;

private void createNetwork() {
    scenario = new ScenarioImpl();
    Network network = scenario.getNetwork();
    Node node1 = network.getFactory().createNode(scenario.createId("node1"), scenario.createCoord(0.0, 0.0));
    Node node2 = network.getFactory().createNode(scenario.createId("node2"), scenario.createCoord(1.0, 1.0));
    Link link = network.getFactory().createLink(scenario.createId("link"), node1.getId(), node2.getId());
    network.addNode(node1);
    network.addNode(node2);
    network.addLink(link);

    new NetworkWriter(network).write("network.xml");
}
```

OpenStreetMap

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examples: 'Alkmaar', 'Regent

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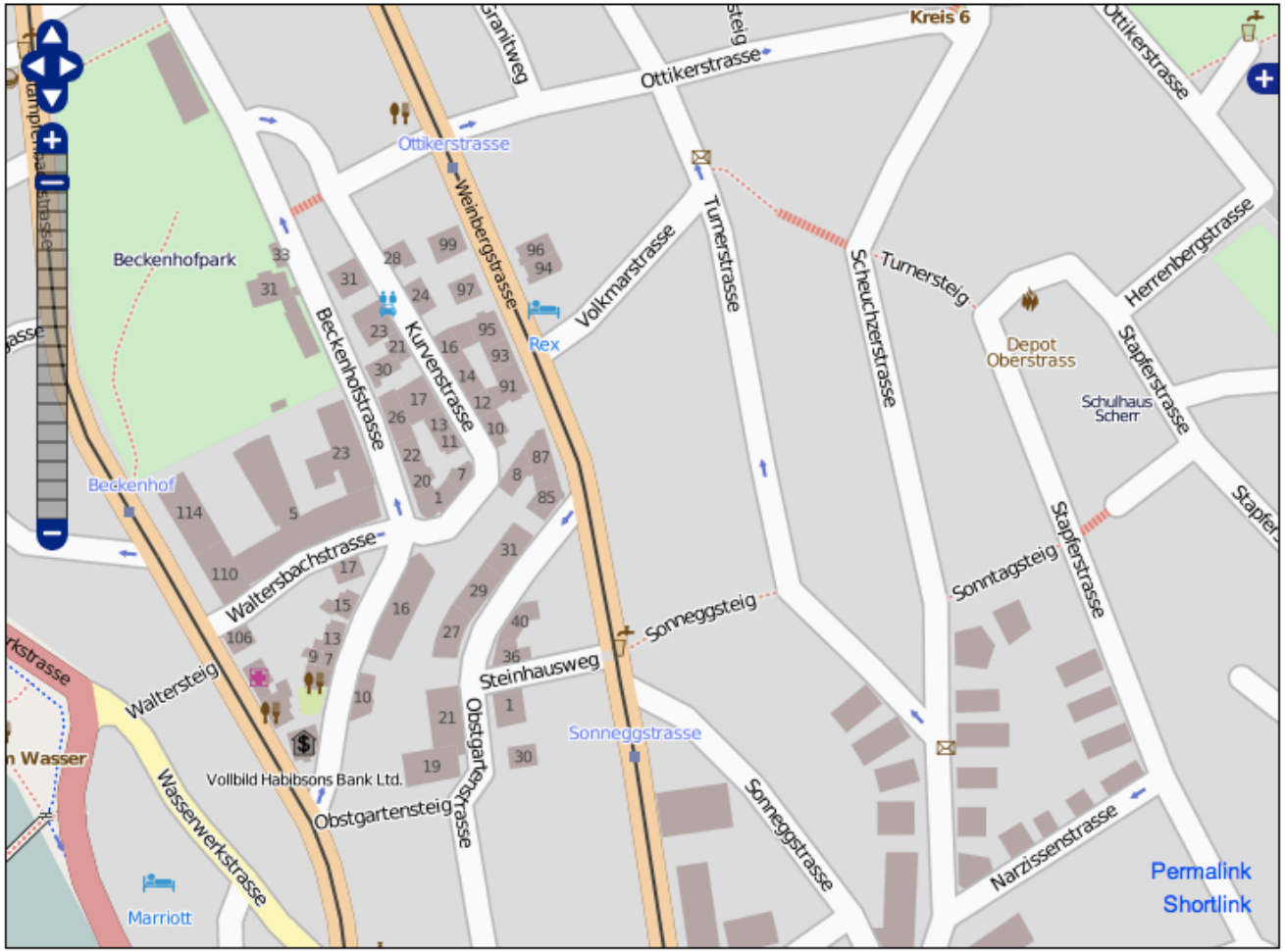

OpenStreetMap

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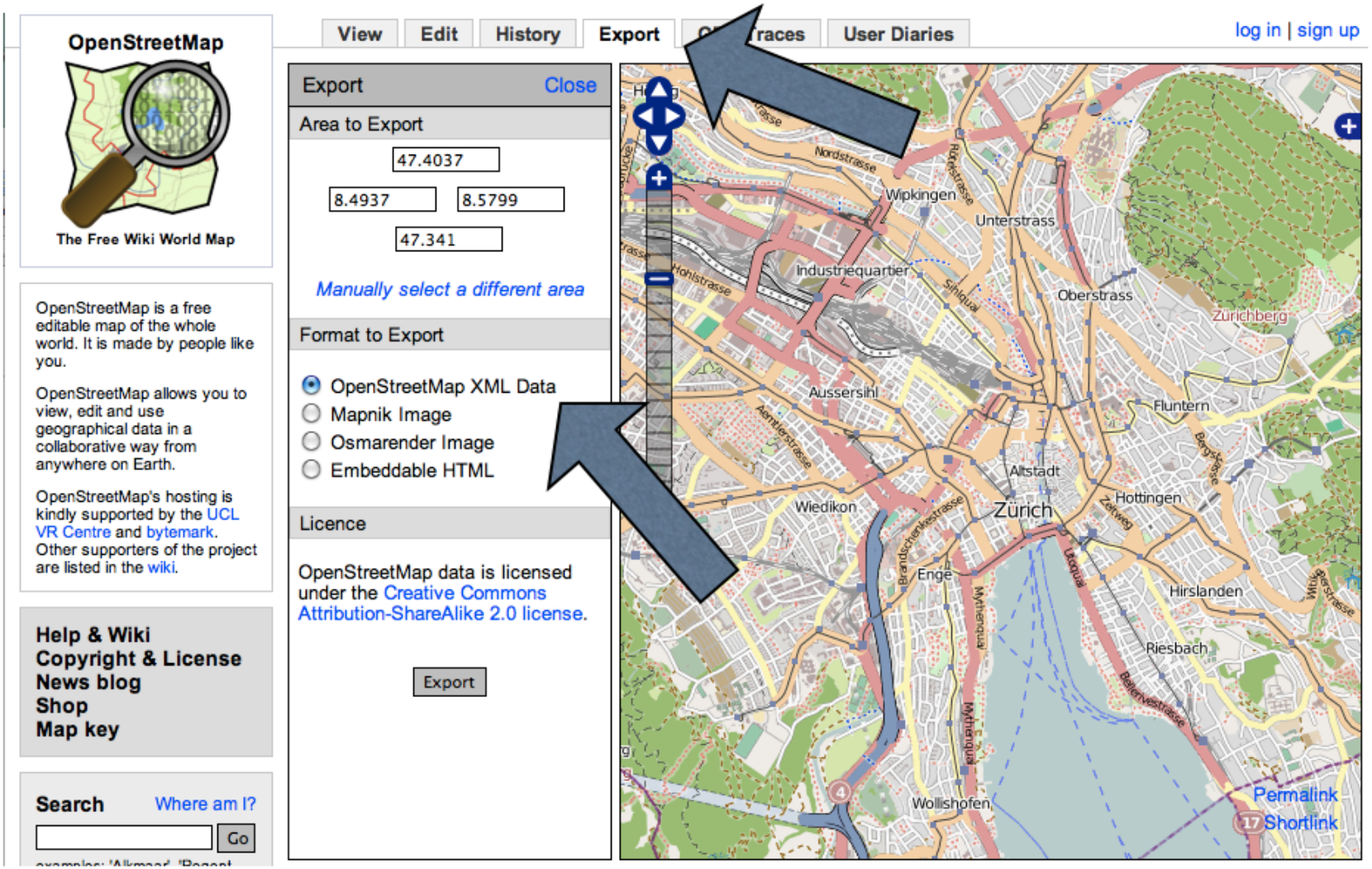
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47.4037
8.4937
8.5799
47.341
Manually select a different area
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Altstadt
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Wiedikon
Zürich
Enge
Hirslanden
Riesbach
Wollishofen
Permalink
Shortlink

```
<node
    id="172541"
    version="2"
    timestamp="2009-03-03T14:13:01Z"
    uid="13203"
    user="bahnpirat"
    changeset="728814"
    lat="52.565527"
    lon="13.3362226"/>
```

Very similar to MATSim.

Slightly different from MATSim:

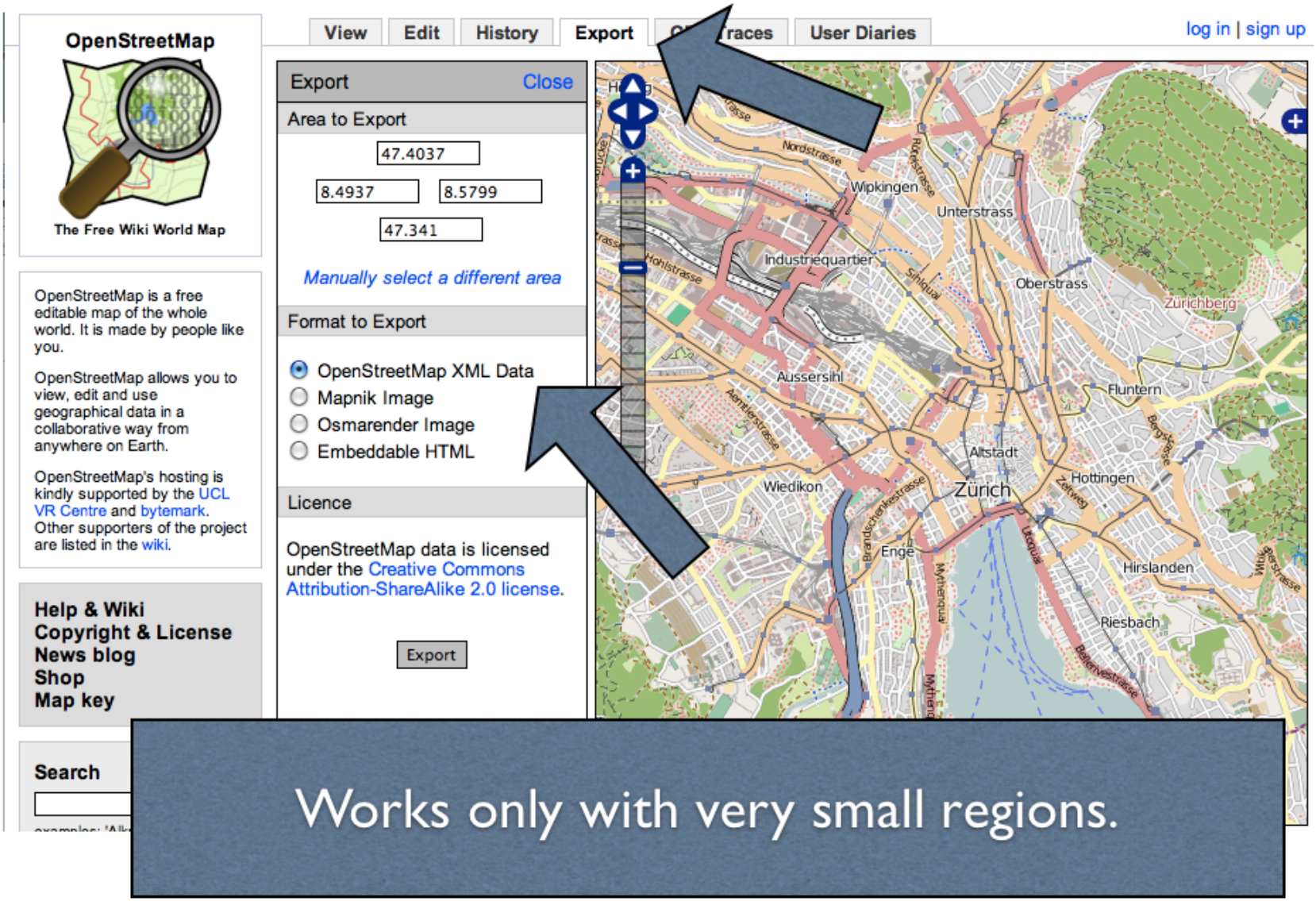
```
<way id="3996955" version="14" timestamp="2009-07-06T19:34:32Z" uid="84566" user="fritzmimi">

    <nd ref="484142"/>
    <nd ref="268016008"/>
    <nd ref="484143"/>
    <nd ref="268015655"/>
    <nd ref="484144"/>
    <nd ref="268015974"/>
    <nd ref="484145"/>
    <nd ref="435546970"/>


    <tag k="created_by" v="Potlatch 0.9c"/>
    <tag k="embankment" v="yes"/>
    <tag k="highway" v="motorway"/>
    <tag k="int_ref" v="E 51"/>
    <tag k="oneway" v="yes"/>
    <tag k="osmarender:renderName" v="no"/>
    <tag k="osmarender:renderRef" v="no"/>
    <tag k="ref" v="A 115"/>

</way>
```

Spans several nodes.

Must be unrolled to several links.

Schema-less bag of tags.

Must be mapped to link properties.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Manually select a different area
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Export
Wipkingen
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Oberstrass
Zürichberg
Aussersihl
Fluntern
Altstadt
Hottingen
Wiedikon
Zürich
Enge
Hirslanden
Riesbach
Works only with very small regions.

Planet.osm:
The world in 160 gigabytes.

geofabrik.de provides country-sized bits.

switzerland.osm:
Switzerland in 1 gigabyte.

Select data by bounding box.

```
osmosis
  --rx file=switzerland.osm
  --bounding-box top=47.701 left=8.346
  bottom=47.146 right=9.019
  completeWays=true
  --used-node
  --wx zurich.osm
```

Select data by tags.

```
osmosis
  --rx file=switzerland.osm
  --tf accept-ways
  highway=motorway,motorway_link,trunk,
  trunk_link,primary,primary_link
  --used-node
  --wx switzerland-bigroads.osm
```

Merge two networks.

```
osmosis
  --rx file=switzerland-bigroads.osm
  --rx zurich.osm
  --merge
  --wx merged-network.osm
```

Convert OpenStreetMap network to MATSim.

```
String osm = "zurich.osm";
Scenario sc = new ScenarioImpl();
Network net = sc.getNetwork();
CoordinateTransformation ct =
    TransformationFactory.getCoordinateTransformation(TransformationFactory.WGS84, TransformationFactory.WGS84_UTM35S);
OsmNetworkReader onr = new OsmNetworkReader(net,ct);
onr.setHierarchyLayer(48.15, 5.71, 45.41, 11, 6);

onr.parse(osm);
new NetworkWriter(net).write("network.xml");
```

OSM coordinate system

Target coordinate system of your choice

Task

- Create a road network model of Zurich
- To contain:
  - all roads of the city
  - primary roads of all of Switzerland

Task

1. Get the switzerland.osm file.
2. Use openstreetmap.org to measure a bounding box of Zurich.
3. Use osmosis to create zurich.osm, containing all roads of Zurich and primary roads of Switzerland.
4. Create a MATSim network.xml file using OsmNetworkReader.