# MapOSMatic: city maps for the masses

Thomas Petazzoni

Libre Software Meeting

July 9th, 2010

# Outline


1. The story
2. MapOSMatic
3. Behind the web page
4. Pain points
5. Future work
6. Conclusion

# Who I am

Thomas Petazzoni

- Embedded Linux Engineer at Free Electrons
- Major contributor to Buildroot, an embedded Linux build system
- Free software enthousiast (Toulibre, Agenda du Libre)
- A basic OpenStreetMap contributor
- ... and obviously a MapOSMatic developer

The others: David Decotigny, Maxime Hadjinlian, Frédéric Lehobey, Pierre Mauduit, David Mentré, Maxime Petazzoni, Gaël Utard, and a dozen other contributors!

# Original idea

≪ *It would be great to be able to use OpenStreetMap data to generate city maps such as the ones we can see in town signs and in folded maps.* ≫

*Gilles Lamiral, OSM contributor of Bretagne, France*

# Public city maps

# Folded maps

# History

- Most of the development takes place through *hackfests*:
  - gatherings of 4-6 hackers during a week;
  - dedicated to the development of MapOSMatic.

- **Initial hackfest in August 2009:**
  - Six OSM contributors, no knowledge of PostgreSQL, PostGIS, Mapnik and OSM data structure, and in just five days, MapOSMatic was born
  - Limited to France, no support for languages other than French and English, very basic user interface, OSM data never updated

# History (2)

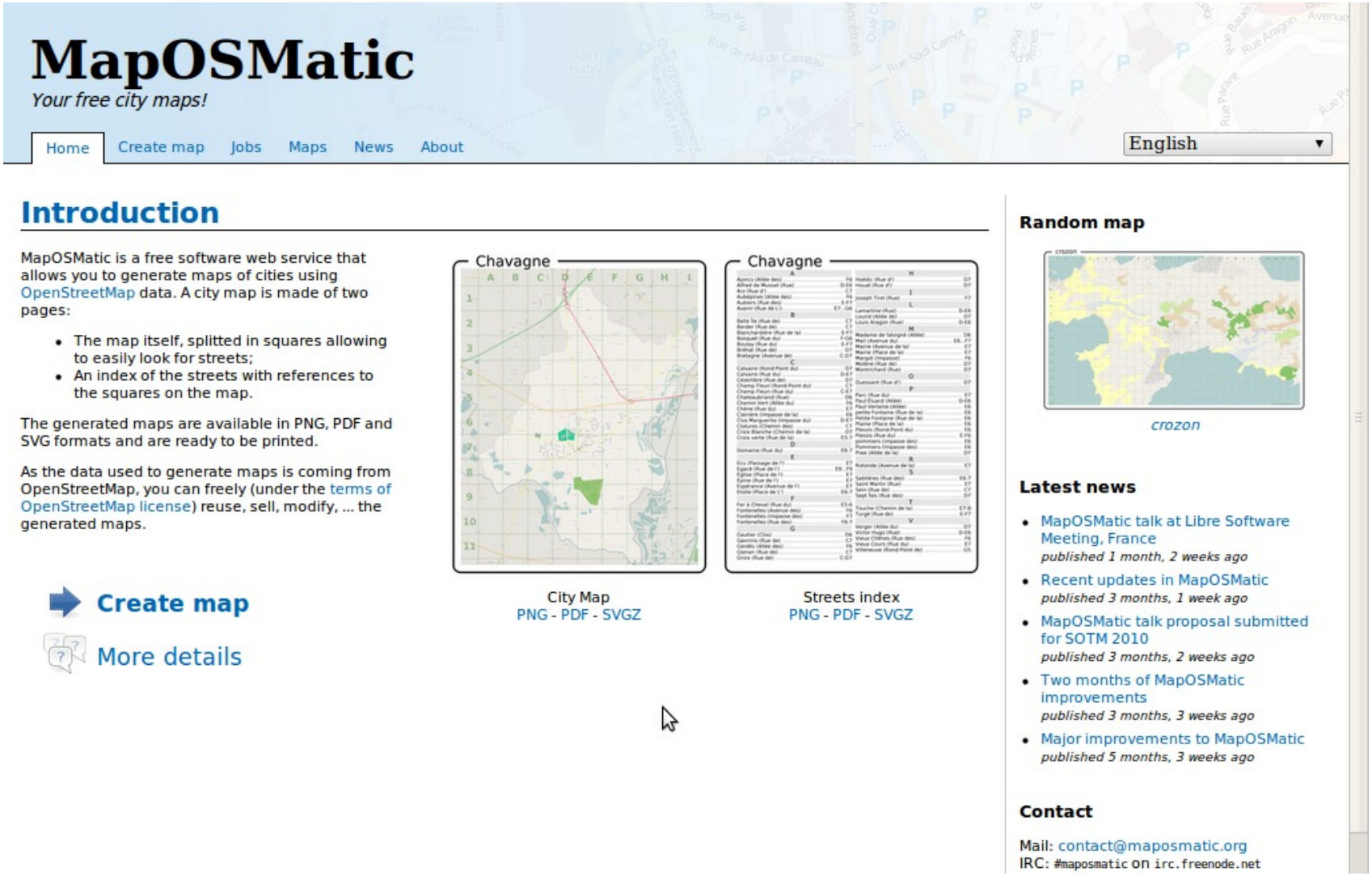
- **Second hackfest in December 2009:**
  - Worldwide coverage, daily updates, i18n infrastructure, revamped user interface, Nominatim-based search, amenities in index

- **Third hackfest to take place in August 2010!**
- Regular but low-traffic development outside the hackfests (UI improvements, R-to-L languages support, etc.)

# Features

- **On-demand rendering** of city maps, composed of a Mapnik rendering of the location overlayed by a grid, and an index of the streets and amenities geo-referenced with the grid.
- Outputs to PDF, SVG and PNG. CSV also available for the index.
- Locations are specified:
  - by **administrative boundaries**. We rely on Nominatim to find the association between a city name and the corresponding administrative boundary. The knowledge of the shape of the city allows us to shade out areas outside of the city;
  - or by **geographic coordinates** with a slippy map.
- Language-dependent processing of street names to provide useful sorting.
  - *Rue du Moulin* $\rightarrow$ *Moulin (Rue du)*, under letter *M*
- All code available under the Affero GPLv3 licence

# Home page


MapOSMatic
Your free city maps!
Home
Create map
Jobs
Maps
News
About
English
Introduction
MapOSMatic is a free software web service that allows you to generate maps of cities using OpenStreetMap data. A city map is made of two pages:
The map itself, splitted in squares allowing to easily look for streets;
An index of the streets with references to the squares on the map.
The generated maps are available in PNG, PDF and SVG formats and are ready to be printed.
As the data used to generate maps is coming from OpenStreetMap, you can freely (under the terms of OpenStreetMap license) reuse, sell, modify, ... the generated maps.
Create map
More details
Chavagne
City Map
PNG - PDF - SVGZ
Chavagne
Streets index
PNG - PDF - SVGZ
Random map
crozon
Latest news
MapOSMatic talk at Libre Software Meeting, France
published 1 month, 2 weeks ago
Recent updates in MapOSMatic
published 3 months, 1 week ago
MapOSMatic talk proposal submitted for SOTM 2010
published 3 months, 2 weeks ago
Two months of MapOSMatic improvements
published 3 months, 3 weeks ago
Major improvements to MapOSMatic
published 5 months, 3 weeks ago
Contact
Mail: contact@maposmatic.org
IRC: #maposmatic on irc.freenode.net

# Map creation: selecting a city

**MapOSMatic**

*Your free city maps!*

Home | Create map | Jobs | Maps | News | About

English

## Generate your own map

*MapOSMatic* covers the whole world but we need contributors to translate and adapt the few parts of *MapOSMatic* that are country specific.

To select the city to be rendered, two modes are available:

- *Using an administrative boundary.* It allows to get a map with precise boundaries of the city when such limits are available in the database. Otherwise, you need to use a bounding box.
- *Using a traditional bounding box.*

Once the rendering is submitted, you will be brought to a page giving the status of your rendering request. As soon as the rendering is completed (that might take some time depending on the queue length), this page will contain links to the generated map.

**Area selection mode:**

- (•) Administrative boundary
- ( ) Bounding box

**City name:**

girona

Girona, Catalunya, España
Girona, Catalunya, España
Girona, Catalunya, España, Europe
Wondering why you can't choose some of these results?
Their administrative boundaries are missing from the OSM database.
Look at the FAQ for more details.

**Random map**

*Port-au-Prince*

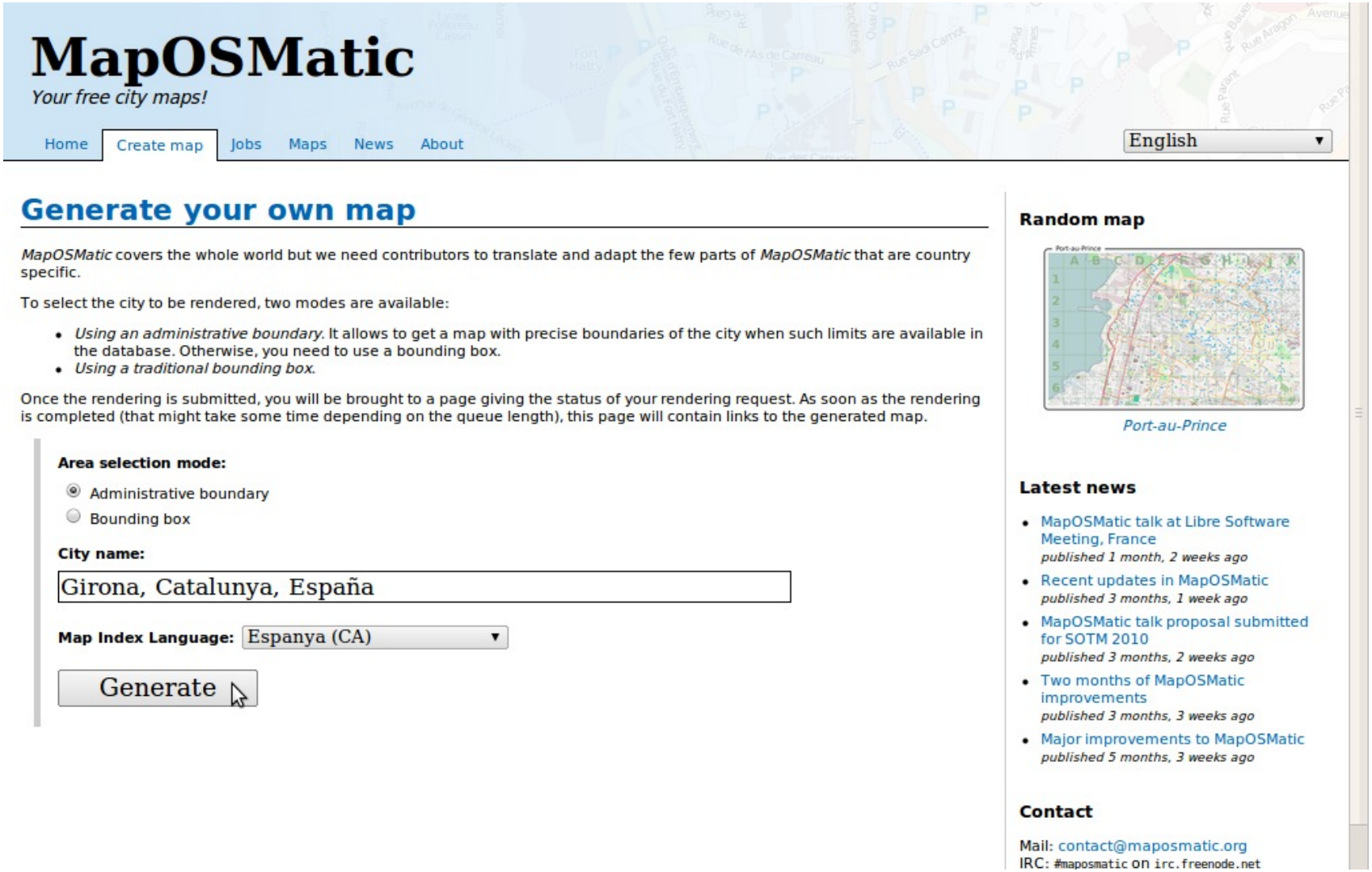
**Latest news**

- MapOSMatic talk at Libre Software Meeting, France
  *published 1 month, 2 weeks ago*
- Recent updates in MapOSMatic
  *published 3 months, 1 week ago*
- MapOSMatic talk proposal submitted for SOTM 2010
  *published 3 months, 2 weeks ago*
- Two months of MapOSMatic improvements
  *published 3 months, 3 weeks ago*
- Major improvements to MapOSMatic
  *published 5 months, 3 weeks ago*

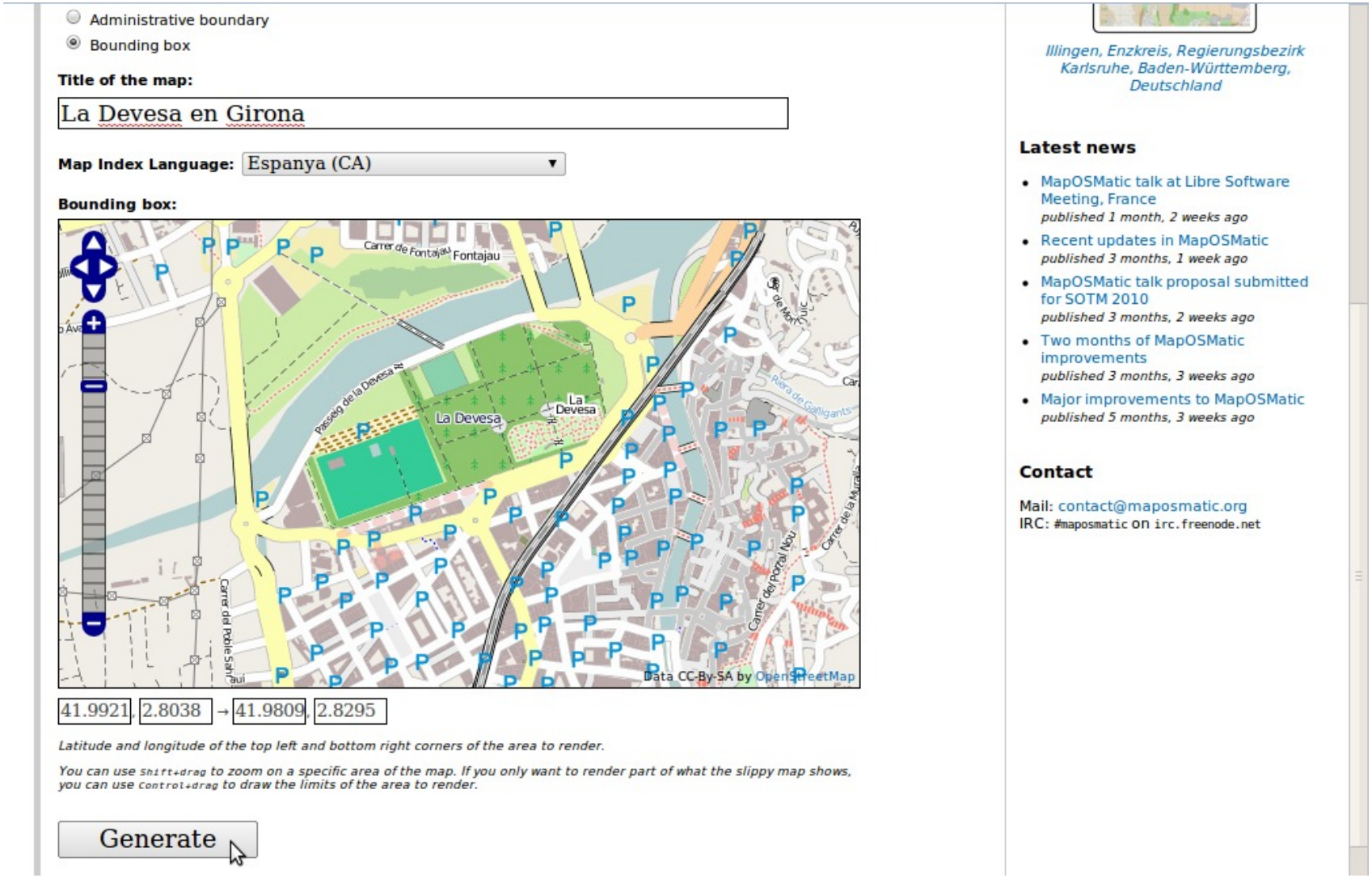
**Contact**

Mail: contact@maposmatic.org
IRC: #maposmatic on irc.freenode.net

# Map creation: select an index language, and go!



# Map creation, by bounding box



# Rendering queue

# Rendering results

**MapOSMatic**

*Your free city maps!*

Home | Create map | Jobs | Maps | News | About | English

## Girona, Catalunya, España

You have been redirected to a similar map, rendered less than 24 hours ago.

**Rendering:**

Rendering submitted Wednesday 30 Jun 2010, 15:30:24.
Completed on Wednesday 30 Jun 2010, 15:32:00 (rendering took 1 minute).

**Files:**

- Map: PNG (7.9 MB), SVGZ (7.4 MB), PDF (12.0 MB).
- Index: PNG (3.9 MB), SVGZ (228.4 KB), PDF (51.2 KB), CSV (35.7 KB).

**Random map**

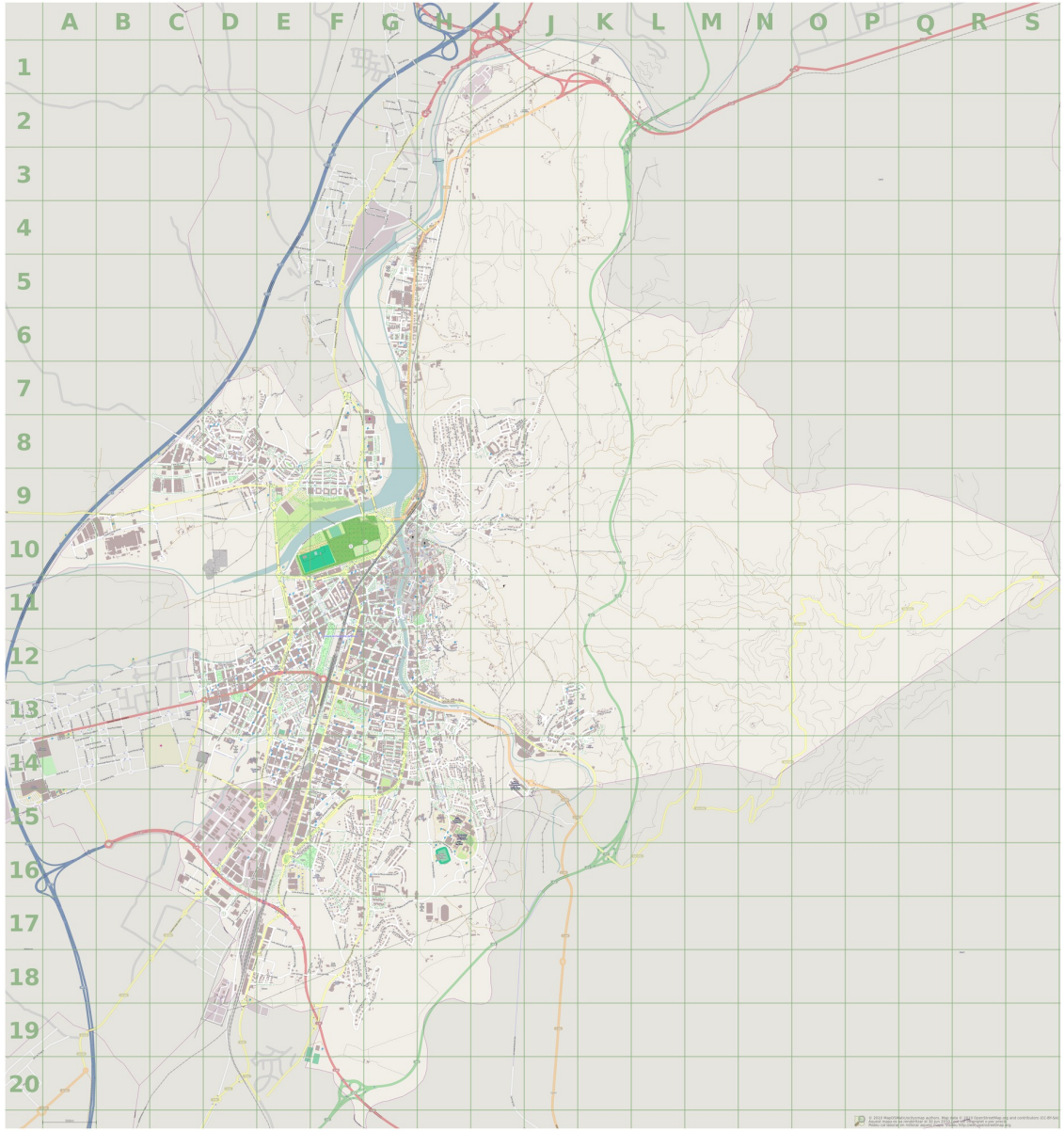
*Bad Windsheim, Neustadt a.d.Aisch-Bad Windsheim, Regierungsbezirk Mittelfranken, Freistaat Bayern, Deutschland*

**Latest news**

- MapOSMatic talk at Libre Software Meeting, France
  *published 1 month, 2 weeks ago*
- Recent updates in MapOSMatic
  *published 3 months, 1 week ago*
- MapOSMatic talk proposal submitted for SOTM 2010
  *published 3 months, 2 weeks ago*
- Two months of MapOSMatic improvements
  *published 3 months, 3 weeks ago*

# Examples

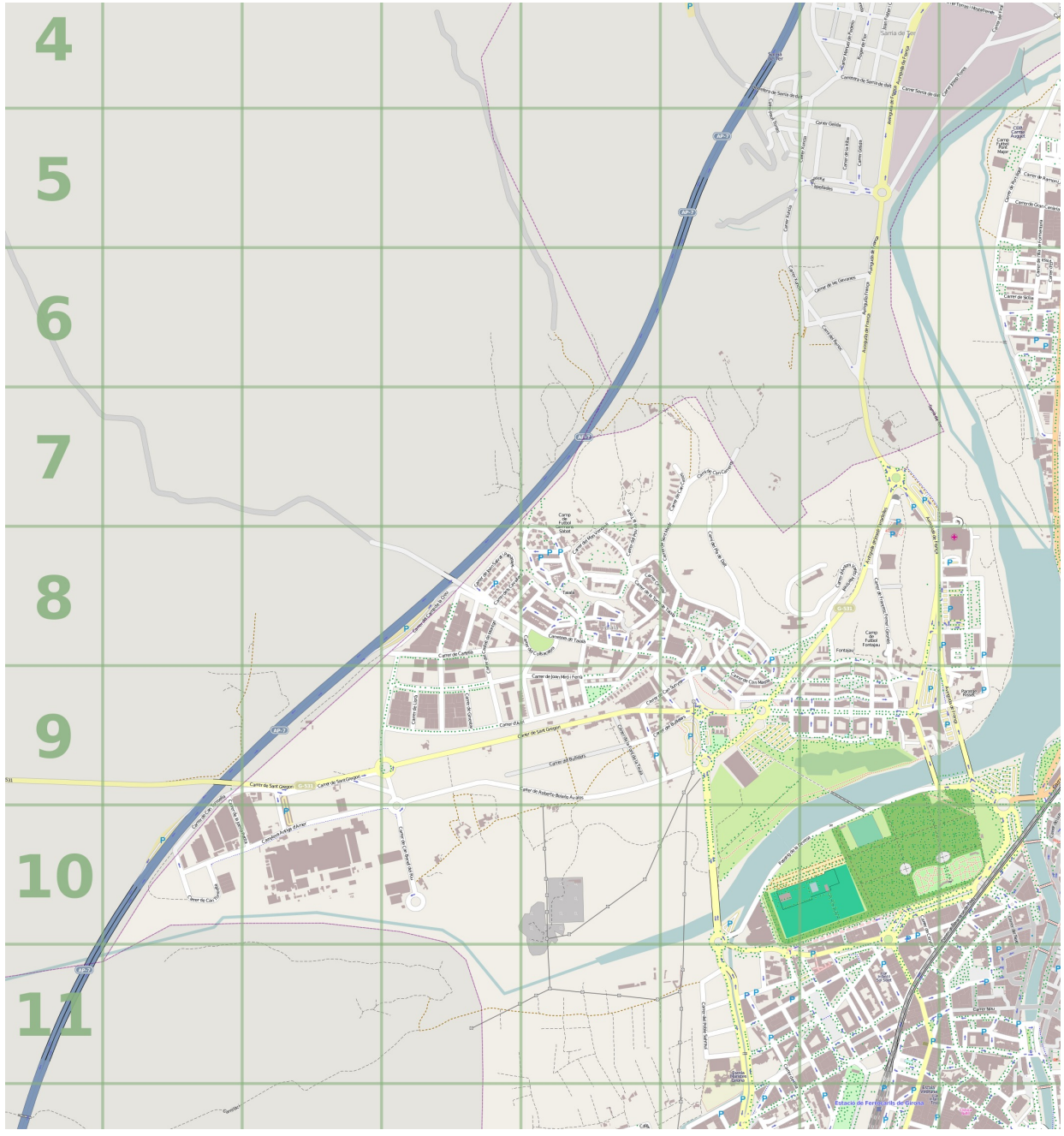
# Girona, Catalunya, España



# Girona, Catalunya, España

| | |
|---|---|
| **2** | |
| 20 de Juny (Avinguda del) | F-G11 |
| **8** | |
| 8 de Juliol de 1809 (Carrer del) | H7...I8 |
| 8 de Març de 1908 (Carrer del) | E17 |
| **A** | |
| Abeuradors (Carrer dels) | G11 |
| Adri (Carrer d') | C-D9 |
| Agustí Pera i Planells (Mirador d') | H9 |
| Agustí Riera i Pou Dr. (Carrer d') | H4 |
| Aiguaviva (Carrer d') | C-D15 |
| Alacant (Carrer d') | E14-16 |
| Albacete (Carrer d') | E14 |
| Albi (Carrer d') | E15...G17 |
| Alemanys (Carrer dels) | H10 |
| Alfred Nobel (Carrer d') | D8 |
| Almogàvers (Carrer dels) | I10-11 |
| Alps (Carrer dels) | D8 |
| Álvarez de Castro (Carrer de) | F-G11 |
| Andalusia (Carrer d') | E8 |
| Andalusia (Plaça d') | D-E8 |
| Andreu Tuyet i Santamaria (Carrer d') | G-H13 |
| Àngela Bivern (Carrer d') | H7-8 |
| Àngel Marsà i Boca (Carrer d') | G6 |
| Àngel Serradell i Pérez (Carrer d') | H14 |
| Anselm Clavé (Carrer d') | G10 |
| Antic Roca Dr. (Carrer d') | G13 |
| Antiga d'Amer (Carretera) | A-C10 |
| Anton Agullana (Carrer d') | G-H14 |
| Antònia Adroher i Pascual (Carrer d') | F12 |
| Antoni Barnés i Gultresa (Carrer d') | C-D16 |
| Antoni Canet (Carrer d') | F15 |
| Antoni Gaudí i Cornet (Carrer d') | E-F13 |
| Antoni Rovira Virgili (Carrer d') | E12 |

[illegible]


4
5
6
7
8
9
10
11

2

20 de Juny (Avinguda del) ..... F-G11

8

8 de Juliol de 1809 (Carrer del) ..... H7...I8
8 de Març de 1908 (Carrer del) ..... E17

A

Abeuradors (Carrer dels) ..... G11
Adri (Carrer d') ..... C-D9
Agustí Pera i Planells (Mirador d') ..... H9
Agustí Riera i Pau Dr. (Carrer d') ..... H4
Aiguaviva (Carrer d') ..... C-D15
Alacant (Carrer d') ..... E14-16
Albacete (Carrer d') ..... E14
Albi (Carrer d') ..... E15...G17
Alemanys (Carrer dels) ..... H10
Alfred Nobel (Carrer d') ..... D8
Almogàvers (Carrer dels) ..... I10-11
Alps (Carrer dels) ..... D8
Álvarez de Castro (Carrer de) ..... F-G11
Andalusia (Carrer d') ..... E8
Andalusia (Plaça d') ..... D-E8
Andreu Tuyet i Santamaria (Carrer d') ..... G-H13
Àngela Bivern (Carrer d') ..... H7-8
Àngel Marsà i Beca (Carrer d') ..... G6
Àngel Serradell i Pérez (Carrer d') ..... H14
Anselm Clavé (Carrer d') ..... G10
Antic Roca Dr. (Carrer d') ..... G13
Antiga d'Amer (Carretera) ..... A-C10
Anton Agullana (Carrer d') ..... G-H14
Antònia Adroher i Pascual (Carrer d') ..... F12
Antoni Barnés i Gultresa (Carrer d') ..... C-D16
Antoni Canet (Carrer d') ..... F15
Antoni Gaudí i Cornet (Carrer d') ..... E-F13
Antoni Rovira Virgili (Carrer d') ..... E12
Antoni Varés i Martinell (Carrer d') ..... E8...F9
Aragó (Carrer de) ..... D-F18
Artillers (Carrer dels) ..... G10
Astúries (Carrer d') ..... E17-18
Aurora Bertrana i Salazar (Carrer d') ..... J13-14
Avel·lí Artís i Gener, "Tísner" (Carrer d') ..... F15

B

Bacià (Carrer de) ..... G11-12
Bailèn (Carrer de) ..... F12
Baix (Carrer de) ..... D12
Balandrau (Carrer del) ..... E13
Balandrau (Passatge del) ..... E13
Balmes (Carrer de) ..... F12-13
Baluard (Carrer del) ..... H-I10
Banyoles (Carrer dels) ..... G11
Barcelona (Carrer de) ..... D18...F14
Barranc (Carrer del) ..... J13...K13
Bassegoda (Carrer del) ..... D12-13
Bastiments (Carrer de) ..... D-E13
Bellaire (Carrer de) ..... G9...H10
Bell-lloc (Plaça dels) ..... G11
Bellmirall (Carrer del) ..... H10
Bellpuig (Carrer del) ..... I-J8
Berenguer Carnicer (Carrer de) ..... G10
Berenguer de Palol (Carrer de) ..... I8-9
Bernat Boades (Carrer de) ..... E11...F11
Besadó (Carrer de) ..... G11
Bescanó (Carrer de) ..... C-D9
Bilbao (Carrer de) ..... E14
Bisbe Dr.cartaña (Carrer de) ..... H10
Bisbe Lorenzana (Carrer de) ..... F-G12
Bisbe Sivilla (Carrer de) ..... F11-12
Bluefields (Carrer de) ..... F9
Bonastruc de Porta (Carrer de) ..... F11...G11
Bonaventura Carreras i Peralta (Carrer de) ..... G-H10
Bosquet (Carrer del) ..... E8-9
Bou d'Or (Carrer del) ..... I-J7
Bru Barnoya Xiberta (Carrer de) ..... F13-14
Bullidors (Carrer del) ..... C-E9

C

Cadí (Carrer del) ..... D8
Calderers (Carrer dels) ..... G10
Calvet i Rubalcaba (Plaça de) ..... G12
Camí de Can Carreres ..... E7
Camí de la Font de l'Abat ..... F8...G9
Camí de l'Escola de Montjuïc ..... H9
Camí del Palco dels Sastres ..... H12
Camí del Pla de Dalt ..... E7-8
Camil Geis (Plaça de) ..... G6
Camí Vell de Fornells (Carrer del) ..... F17...G17
Campcardós (Carrer de) ..... D-E13
Campcardós (Passatge del) ..... D-E13
Camp de la Bateria (Carrer del) ..... E8-9
Camp de la Creu (Carrer del) ..... C8
Camp de la Plana (Carrer del) ..... J13
Camp de les Lloses (Carrer del) ..... D16-17
Camp de Mart (Carrer del) ..... F10-11
Camp d'Or (Carrer del) ..... I8...J8
Camp Gurnau (Carrer del) ..... C16...D17
Francesc Palau i Quer (Carrer de) ..... G-H14
Francesc Pi i Margall (Passatge de) ..... D-E13
Francesc Rogés (Carrer de) ..... F11
Francesc Romaguera (Carrer de) ..... H14-15
Francesc Samsó (Carrer de) ..... G-H10
Frederica Montseny i Mañé (Carrer de) ..... F16-17
Fructuós Gelabert i Badiella (Carrer de) ..... J13

G

Gabriel Roura i Güibas (Carrer de) ..... F14...G14
Galícia (Carrer de) ..... E18
Gaspar Casal Dr. (Carrer de) ..... G11
General Fournàs (Carrer de) ..... G-H10
General Marvà (Plaça del) ..... G11
General Mendoza (Passeig del) ..... G11-12
General O'donnell (Carrer d') ..... I8
General Peralta (Passeig del) ..... H11
George Orwell (Plaça de) ..... H13
Georges Méliès (Carrer de) ..... J14
George Stephenson (Carrer de) ..... D-E16
Germans Busquets (Carrer dels) ..... G11
Germans Lumière (Carrer dels) ..... J13-14
Germans Sàbat (Plaça dels) ..... D8
Ginestar (Carrer de) ..... C9
Girona (Plaça de) ..... J14
Glacis (Passatge del) ..... H8
Gran Canària (Carrer de) ..... G5
Gran Via de Jaume I ..... G10-12
Grup Germans Sàbat ..... D7-8
Grup Girona per Girona ..... H13
Grup la Creueta ..... J14-15
Grup Pont Major ..... G5
Grup Torre Gironella ..... H11...I11
Grup Vila-roja ..... J13...K14
Guillem Bofill (Carrer de) ..... E12
Guillem Colteller (Carrer de) ..... E-F11
Guillem Minali (Carrer de) ..... G11
Guipúscoa (Carrer de) ..... E18

I

Ibèria (Carrer d') ..... F11-12
Ignasi Bosch (Jardins d') ..... E13
Ignasi Iglesias (Carrer d') ..... H9
Impressors Bro (Carrer dels) ..... F11
Impressors Oliva (Carrer dels) ..... F11
Isabel la Catòlica (Carrer d') ..... H12
Isabel Vila i Pujol (Plaça d') ..... D13

J

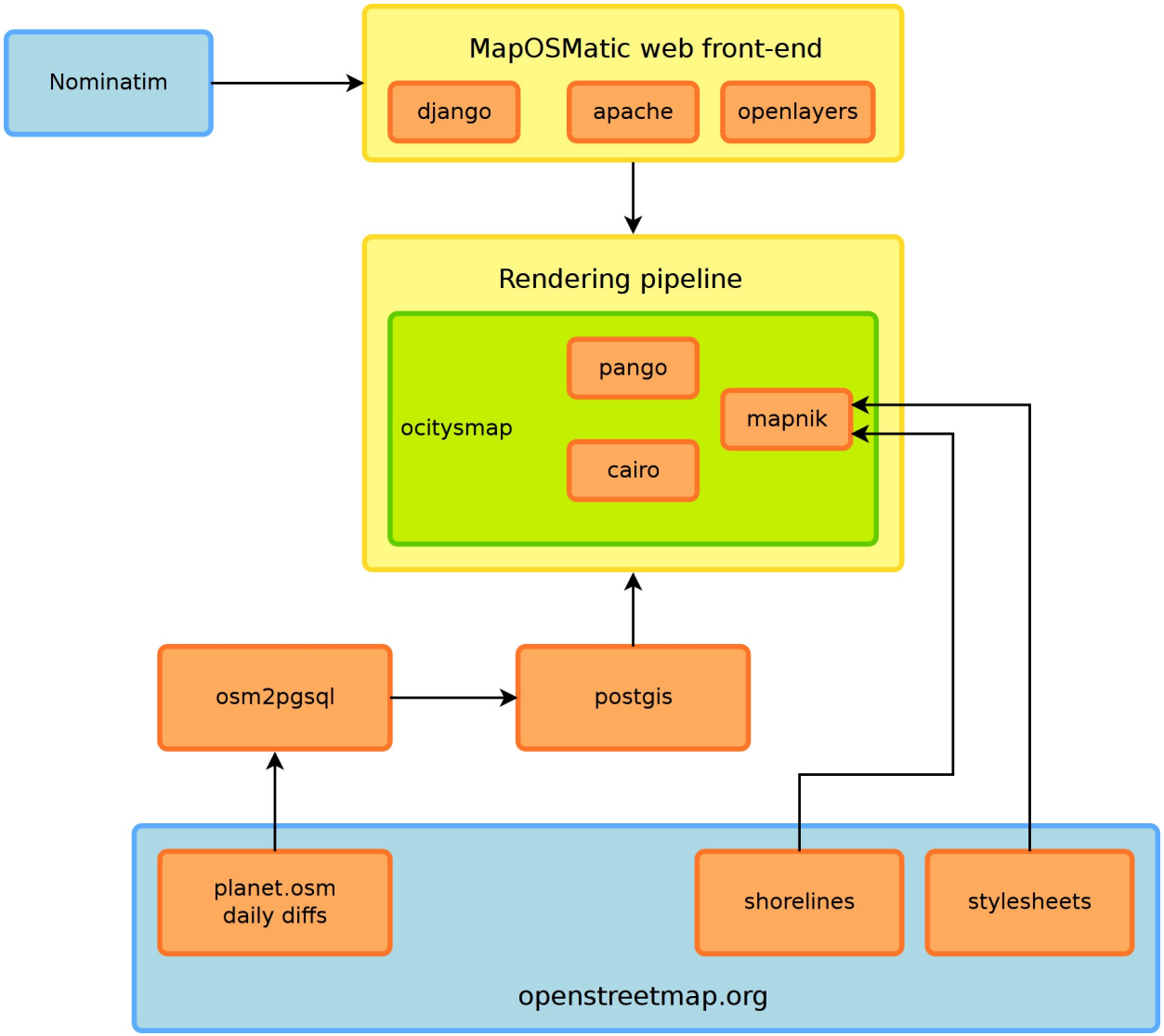
Jacint Verdaguer i Santaló (Plaça de) ..... G11
Jaume Faixó i Fusellas (Carrer de) ..... E11
Jaume Marquès (Carrer de) ..... G14
Jaume Marquès i Casanovas (Carrer de) ..... G14
Jaume Ministral Masià (Carrer de) ..... I8
Jaume Pol i Perera (Carrer de) ..... C-D16
Jaume Pons i Martí (Carrer de) ..... G9-10
Jaume Roca i Delpech (Carrer de) ..... G12
J.camps Arboix (Plaça de) ..... H13
Joan Alsina (Carrer de) ..... F14
Joan Amades i Gelat (Carrer de) ..... E-F16
Joan Badia i Casañas (Carrer de) ..... D8...E9
Joan Baptista Torroella i Bastons (Carrer de) ..... G14
Joan Brossa (Plaça de) ..... F11
Joan Bruguera (Carrer de) ..... G13
Joan Coromines i Vigneaux (Carrer de) ..... H13-14
Joan Fuster i Ortells (Jardins de) ..... H10
Joan Gaspar Roig i Jalpí (Carrer de) ..... D12
Joan Josep Tharrats i Vidal (Carrer de) ..... F-G9
Joan Maragall (Carrer de) ..... F12...G12
Joan Maria Pou i Camps (Carrer de) ..... F14
Joan Masó i Valentí (Carrer de) ..... E12
Joan Miró i Ferrà (Carrer de) ..... D8-9
Joan Oliver i Sallarès, "Pere Quart" (Carrer de) ..... C8
Joan Planas i Castañer (Carrer de) ..... F13
Joan Pons (Carrer de) ..... E11
Joan Regla (Carrer de) ..... G13
Joan Roca i Pinet (Carrer de) ..... F13-14
Joan Salvat i Papasseit (Carrer de) ..... C-D8
Joan Tarrús i Bru (Carrer de) ..... F13
Joan Torró i Cabratosa (Carrer de) ..... D-E16
Joan Viñas i Bona (Carrer de) ..... I16
Joaquim Botet i Sisó (Carrer de) ..... H13-14
Joaquim Maria Masramon i de Ventós (Carrer de) ..... G16
Joaquim Pla i Cargol (Carrer de) ..... G-H11
Joaquim Pla i Dalmau (Plaça de) ..... G12
Joaquim Riera i Bertran (Carrer de) ..... F15
Joaquim Ruyra i Oms (Carrer de) ..... H13-14
Joaquim Vayreda (Carrer de) ..... E11...F11
Jocs Olímpics de Barcelona (Carrer dels) ..... G16-17
John Lennon (Jardins de) ..... H10
Josep Aguilera i Martí (Carrer de) ..... G15
Josep Ametller i Viñas (Carrer de) ..... G13
Josep Bosch i Puy, "Piculives" (Carrer de) ..... H14
Josep Canal i Roquet (Carrer de) ..... F14
Josep Carner i Puig-Oriol (Passeig de) ..... F16-17
Josep Clarà i Ayats (Carrer de) ..... H13-14

# Architecture

MapOSMatic is composed of:

1. the **MapOSMatic web service**, implemented using the Django web framework.
   - Uses OpenLayers for the slippy map and Nominatim for the administrative boundary search;
   - Stores rendering request into a database.
2. the **OcitySMap** Python module that generates the map and index according to area coordinates, administrative area name or OSM polygon ID.
3. the **MapOSMatic daemon**, which:
   - processes pending rendering requests from the database with **OcitySMap**;
   - updates the database to inform the **MapOSMatic** web front-end that the rendering has been completed.

# Architecture



# Details on OcitySMap

- Uses Mapnik to generate the map using the default OSM stylesheet and print the grid and labels. The Mapnik stylesheet queries the PostGIS database for OSM data.
- Queries the PostGIS database to find the streets and amenities corresponding to each square of the grid.
- Uses Pango and Cairo to generate the index. The page formatting in columns is done manually with Cairo.
- Cairo is finally used to integrate the map and the index into a frame with the map title and to generate the final output files.

# Infrastructure

- MapOSMatic runs on a dedicated hosted server with:
  - Dual core E2180 @ 2GHz Intel machine
  - 2 GB RAM
  - 3.5 GB swap
  - 1x 250 GB SATA-II hard drive
  - Ubuntu 9.04 x86_64
- We're currently moving to a bigger, faster server because:
  - The OSM database size has grown considerably and nearly doubled in the past 9 months (and it's not slowing down, but keep it up, contributors!)
  - The duration of each daily update is soon going to be longer than a day (16 to 20 hours avg)

# Some statistics

- Planet OSM database: 177 GB
- 4000 unique visitors per month
- 50 rendered maps/day avg.

$\Rightarrow$ **15,000 maps rendered since September, 2009**

# Standing on the shoulders of giants

- Power of F/OSS software: in just a few days, it was possible to learn, understand and set up an OSM application such as MapOSMatic
- MapOSMatic is 1400 lines of Python and OcitySMap is 2000 lines of Python. The rest is a bit of HTML/JavaScript for the web front-end and the translations
- First-level dependencies (PostgreSQL, PostGIS, Apache, Mapnik, etc.) of MapOSMatic stand for more than 600.000 lines of code. We've written only 0.5% of this to create our application.

# OSM data

- Usage of administrative boundaries at the city level is not yet widespread. Few OSM communities in the world have started importing administrative boundaries.
- Inconsistent `admin_level`:
  - In France, all cities use `admin_level=8`
  - In Germany, some use 4, some 6 and others 8, depending on the city's importance
  - Other countries have different rules
- Insufficient information to generate a correctly sorted street index.
  - *Rue Paul Verlaine* is indexed at *Paul Verlaine (Rue)*
  - We should have *Verlaine (Rue Paul)* (Verlaine being the family name). Cannot be done automatically, needs additional OSM data/tagging.
- Only one language for street/city names imported by `osm2pgsql`. HStore?

# Mapnik

- When streets are small, Mapnik doesn't render their labels. Problematic since those streets are visible in the index but not on the map.
- Mapnik consumes too much memory to render large PNG maps.

# Future work

- **On the map:**
  - legend
  - additional and configurable POIs and layers (in connection with Chimère ?)
- **Rendering options:**
  - paper size selection
  - splitted map on several pages
  - configurable styles
- **Infrastructure changes:**
  - new server
  - use Osmosis for minutely updates
  - rendering optimizations
- *Your feature!*

# Conclusion

- We would like to thank the OSM community for having created the data and tools that allowed applications such as MapOSMatic to be created
- We hope that MapOSMatic is useful as another example of why OpenStreetMap and free geographical data are nice, and hope to make it even more useful in the future
- **And once again, MapOSMatic is free software, so please join the game! We have a mailing-list, Git repository and IRC channel!**

1. `http://www.maposmatic.org`
2. `irc://irc.freenode.net/#maposmatic`