

Come Make a Map!

Completely Custom, Open Source Maps with TileMill



TileMill

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Open Source Bridge 2013 • Portland, Oregon



tinyurl.com/tilemill

Your Host

- I work for MapBox
- I don't have a traditional GIS background
- Bit of an amateur map-maker
- Mostly doing iOS dev these days
- ~14 years contributing to open source

MapBox

- Ecosystem around fast, beautiful maps
- We charge for cloud hosting (high availability)
- Produce lots of open source code

MapBox

mapbox (MapBox) · GitHub

https://github.com/mapbox

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MapBox
mapbox

Washington DC
<http://www.mapbox.com>
Joined on Feb 04, 2011

116 **23**
public repos members

mapbox.js JavaScript ★ 288 65
MapBox Javascript API
Last updated an hour ago

tilemill JavaScript ★ 1,349 181
A modern map design studio.
Last updated 15 hours ago

tilemill-builder-osx Shell ★ 3 0
Build script for portable, complete Mac version of TileMill
Last updated 15 hours ago

maki JavaScript ★ 505 49
POI Icon Set
Last updated 16 hours ago

tilelive-vector JavaScript ★ 12 3

Goal: Custom Map

- Portland food carts
 - Over 500 licensed
 - Carts, streets, transit, parks, ATMs
- Mobile
- Interactive
- Offline-capable



Types of Geo Data

- Shapefile - vector, proprietary, common
- GeoJSON - simple text
- KML - XML, kinda sprawly
- Rasters/GeoTIFF (pixel data)
- OpenStreetMap (XML/PBF)
- SQLite (not necessary geo)
- PostGIS (geo RDBMS)



Getting Data

- Open government - civicapps.org, developer.trimet.org
- Create your own
 - GeoJSON
 - KML (XML)
- Cart data: foodcartsportland.com map (KML export)

Geo Utilities

- GDAL - gdal.org
 - MIT-licensed open source
 - Command-line tools & libraries
- Quantum GIS - qgis.org
 - GPL-licensed open source
 - “GIS system”



TileMill

- Geographic design studio
- BSD-licensed open source
- Node.js (yes, on the desktop)
- Runs on Linux, Mac, Windows
- mapbox.com/tilemill



TileMill

Geography Class

style.mss x labels.mss x rainbow.mss x +

1 /*****
 2
 3 This file is responsible for assigning colors to each country. Color
 4 assignment is mostly manual. Not taking advantage of Natural Earth's
 5 'MAP_COLOR' field because it did not exist when I started, and at any
 6 rate I want a smaller palette :)
 7
 8 *****/
 9
 10 @white: #F0F8FF; /* blue-tinted, for Antarctica */
 11 @red: #fdaf6b;
 12 @orange: #fdc663;
 13 @yellow: #fae364;
 14 @green: #d3e46f;
 15 @turquoise: #aadb78;
 16 @blue: #a3cec5;
 17 @purple: #ceb5cf;
 18 @pink: #f3c1d3;
 19 @f00: #f00;
 20
 21 /* Coastlines */
 22 #country::land-glow-inner[zoom>=0] {
 23 line-color:@line;
 24 line-opacity:0.8;
 25 line-join:round;
 26 [zoom=0] { line-width:1.2; }
 27 [zoom=1] { line-width:1.6; }
 28 [zoom=2] { line-width:2; }
 29 [zoom>2] { line-width:2.4; }
 30 }
 31
 32 #country::land-glow-outer[zoom>1] {
 33 line-color:@line;
 34 line-width:5;
 35 line-opacity:0.1;
 36 line-join:round;
 37 }
 38
 39 #country::fill[zoom>=0] {
 40 [ADM0_A3='ABW'] { polygon-fill:@purple; }
 41 [ADM0_A3='AFG'] { polygon-fill:@red; }
 42 [ADM0_A3='AGO'] { polygon-fill:@yellow; }
 43 [ADM0_A3='AIA'] { polygon-fill:@blue; }
 44 [ADM0_A3='ALB'] { polygon-fill:@purple; }
 45 }

Map showing countries and cities. Philippines flag and name are highlighted. Layers panel includes #country-interaction, #paper, #cities, #country-name, #geo-lines, #glacier, #admin-0-line-land.border.country, and #admin-0-line-disputed.border.disputed. A color palette is visible at the bottom right.

CartoCSS

- It's like, well, CSS
- Reference at mapbox.com/carto
- Allows for realtime editing of features

```
5 #streets {  
6   line-width: 1.0;  
7   line-color: gray;  
8   line-opacity: 0.5;  
9  
10  [zoom >= 17] {  
11    line-width: 10.0;  
12    text-name: "[STREETNAME]";  
13    text-face-name: "Verdana Regular";  
14    text-fill: white;  
15    text-opacity: 0.5;  
16    text-min-distance: 200.0;  
17    text-placement: line;  
18  }  
19  
20  [zoom = 18] {  
21    line-width: 20.0;  
22  }  
23  
24  [zoom >= 19] {  
25    line-width: 30.0;  
26  }  
27 }
```

Packaging & Distributing

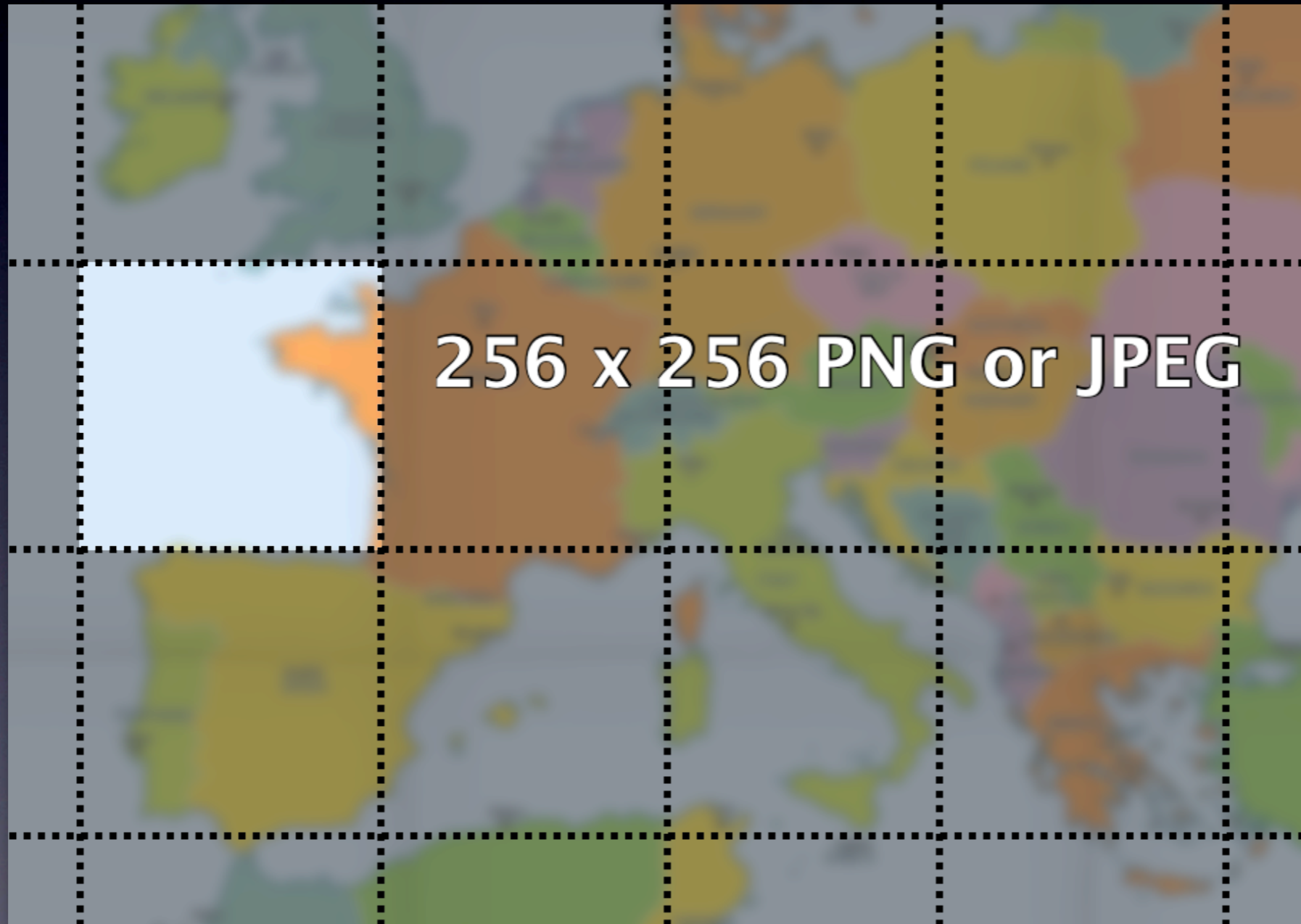
- Size
- Ease of transfer
- Robustness
- Cross-platform capability



Map Tiles

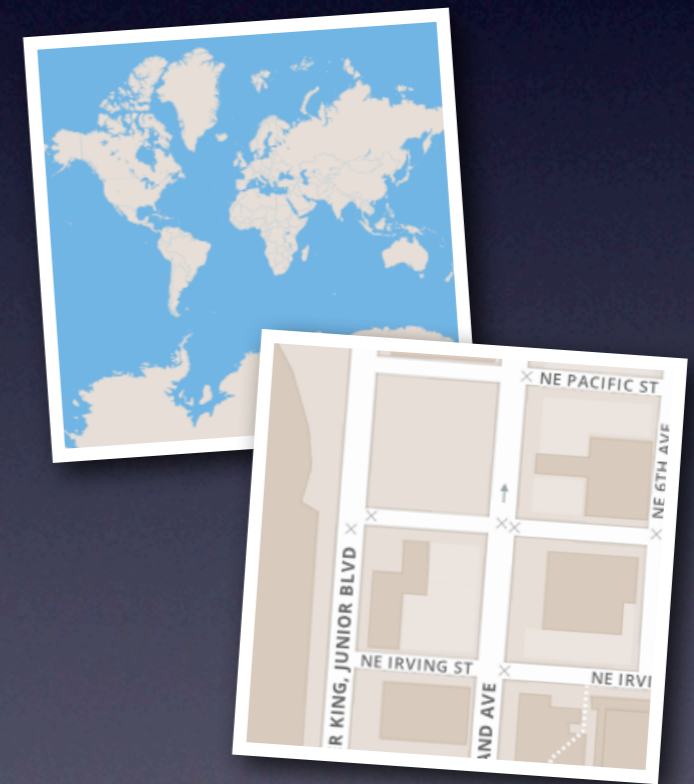


Map Tiles



The Problem With Tiles

- Can easily number in the millions
- Zoom level 0
 - One 256x256 tile (4^0)
- Zoom level 17
 - **17,179,869,184** tiles (4^{17})
- Difficult to transfer reliably

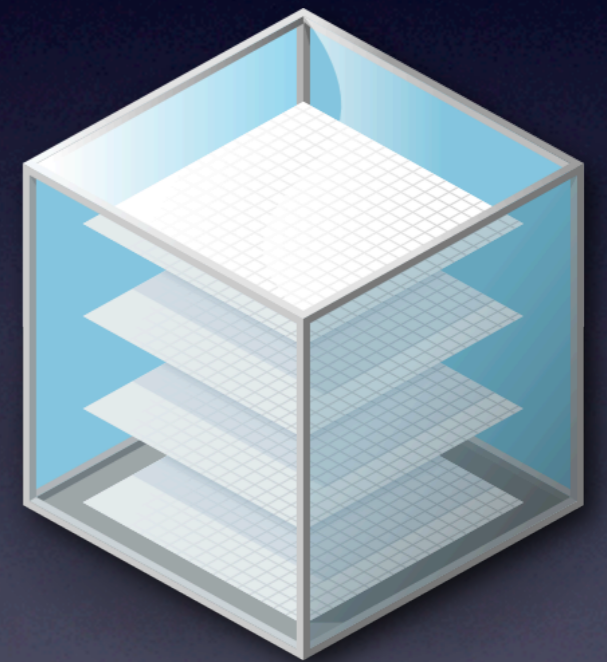




MBTILES

What is MBTiles?

- Originated from this scale problem
 - Especially on mobile (USB & net)
- Essentially just SQLite with blobs
 - Index by tile $z/x/y$
- Add metadata, optimizations



Mobile Use

- MBTiles works for tile serving
 - MapBox cloud hosting, TileStache
- But what about offline use?
 - MBTiles can be used directly!
 - MapBox iOS SDK (BSD-licensed)



Let's Make a Map!

Conclusion

- The open source toolchain is there
- Portability problems have been solved
- The democratization of maps is at hand!
- Also: maps are fun



Thanks!

- Reach me: justin@mapbox.com and [@incanus77](https://twitter.com/incanus77)
- MapBox: mapbox.com and [@mapbox](https://twitter.com/mapbox)
- Slides and project files up on GitHub
 - github.com/incanus/osb13

