Geographic Information Systems

WMTS : Convert geolocation (lat, long) to tile index, at a given zoom level?

Asked 8 years ago Modified 2 years, 6 months ago Viewed 26k times

27

I wanted to know how to get the indexes (x,y) of a WMTS tile for a given geolocation (latitude, longitude) and zoom level.

For exemple, I have a POI located at (48.675, 2.7), I want to get the corresponding open-street-map tile for the zoom 10.

Can I do the math ? Do I need a webservice ? Precision : I have to do this programmatically.

convert development wmts

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edited Feb 5, 2015 at 11:00
SS_Rebelious
5,581 2 25 61

asked Feb 5, 2015 at 10:37
Neekobus
731 1 6 8

2 Here you go: wiki.openstreetmap.org/wiki/... – John Powell Feb 6, 2015 at 8:38

A useful MSDN Article on the Bing Maps Tiling Scheme also provides a good primer. Both this and the OSM article assume Web Mercator projection, but the principle is the same for other projected co-ordinate systems. – kes Feb 6, 2015 at 14:48

1 Answer

Sorted by: Highest score (default)

36

The OSM wiki page is perfect :
http://wiki.openstreetmap.org/wiki/Slippy_map_tilenames#Lon..2Flat._to_tile_numbers_2

Here is the extracted answer (in pseudo code) for quick reference.

Given Longitude/latitude/zoom to tile numbers :

```
n = 2 ^ zoom
xtile = n * ((lon_deg + 180) / 360)
ytile = n * (1 - (log(tan(lat_rad) + sec(lat_rad)) / π)) / 2
```

Note that `log()` in this pseudo code refers to natural log (often "ln()" in common math syntax, but often "log()" in many programming languages).

Given Tile numbers to longitude/latitude :

```
n = 2 ^ zoom
lon_deg = xtile / n * 360.0 - 180.0
lat_rad = arctan(sinh(π * (1 - 2 * ytile / n)))
lat_deg = lat_rad * 180.0 / π
```

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edited Oct 3, 2018 at 23:36

ak112358
762 9 16

answered Feb 7, 2015 at 17:26

Neekobus
731 1 6 8

2 wait, the OSM slippy format is the WMTS tile format? – spy Dec 15, 2016 at 1:52

10 Note that the link above has implementations in *many* languages! (27 currently) – Cyrille Mar 13, 2017 at 10:40

1 Be aware that according to this link , latitude goes from 0 to 85.0511 °N (not 90 °N) and from 0 to 85.0511 °S (not 90 °S). The number 85.0511 is the result of arctan(sinh(π)). By using this bound, the entire map becomes a (very large) square – AmirHossein Rezaei Jan 31, 2021 at 11:06