

WMS POSITION - MAPS

DESCRIPTION OF WMS POSITION - MAPS

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Web Map Service (WMS) enables to use map data distributed via Internet in map and GIS end-user applications. WMS services are standardized in the specification Open Geospatial Consortium, Inc. (OGC).

More on <http://www.opengeospatial.org/standards/wms>.

WMS Position - Maps supports standard Open Geospatial Consortium - Web Map Service in versions 1.0.0, 1.0.7, 1.1.0, 1.1.1, 1.3.0.

The client of WMS Position may be any application supporting this standard. WMS Position is fully integrated into map applications on our NavigGate sw platform.

The Service security is guaranteed by communication via secured channel SSL - certification THAWTE. The tradition and quality of THAWTE certification allows full client's confidence.

Access to service can be allowed only for specified domains.

FLEET AND GIS APPLICATION - ACCESS TO WMS POSITION - MAPS

The access security is resolved by Username and Password.

The access is possible by classical access parameters or simply by specification in URL address:

A) <https://wms.position.cz/data?auser=XXXX&apass=YYYY>

B) <https://wms.position.cz/data/XXXX/YYYY/>

Demo access to the basic data set:

<https://wms.position.cz/data?auser=demo&apass=demo> - enables the access to demo layer only

WMS Position - Maps Layers – standardly the following layers are available:

| | |
|---------|--|
| M_EU | includes data HERE (NAVTEQ) Europe |
| M_EU_TR | includes data HERE (NAVTEQ) Europe + truck attributes visualisation |
| M_SA | includes data HERE (NAVTEQ) South America |
| M_CZ | includes data HERE (NAVTEQ) Czech Republic |
| M_DE | includes data HERE (NAVTEQ) Germany |
| M_SK | includes data HERE (NAVTEQ) Slovak Republic |
| MT_CZ | includes data HERE (NAVTEQ) Czech Republic and local turistic maps 1:25 000 CZ |
| DEMO | includes only overview map of Europe Position |
| .. | other local customer settings |



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The data scale set:

Mercator projection containing 3 levels of Position's overview maps of World and HERE (Navteq) Europe data in Zoom levels 7 -16 (17 locally) corresponding with most popular "standard" zoom levels scale.

Other projections containing Position's overview maps of Europe 1:20 mil., 1:6 200 000, 1:3 000 000 and HERE (Navteq) data set 1:1mil., 1:500 000, 1:200 000, 1:75 000, 1:25 000, 1:12 500 (+ locally 1:6 250).

Note: For the best quality of displayed data while zooming is recommended to count with recalculation 96dpi/200dpi (Position's DPI = 200), it means 0,48 x default scale set.

Information about the Service:

<https://wms.position.cz/data?request=GetCapabilities>

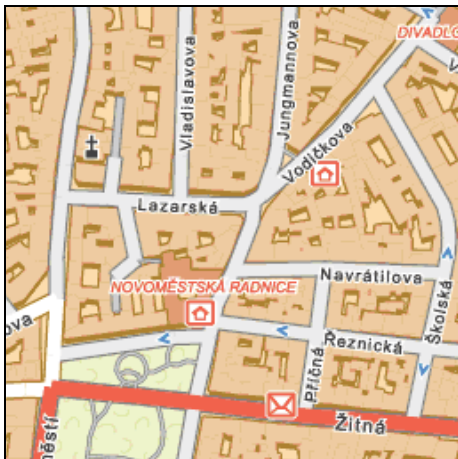
Information on the service and layers assigned to the user:

<https://wms.position.cz/data/XXXX/YYYY/?request=GetCapabilities>

| | | |
|----------------------------|---|--|
| <u>Coordinate systems:</u> | Mercator (EPSG:3857) | for M_EU, M_DE, M_CZ, M_SK or customer settings |
| | UTM 33 (EPSG:32633) | for M_EU; M_EU_TR; MC_EU; M_DE; M_CZ; MC_CZ; M_CZ_KM; M_SK; DEMO |
| | S-42 - 3 (EPSG:28403) | for M_EU; M_EU_TR; MC_EU; M_CZ; M_CZ_BD; MC_CZ; M_CZ_KM; M_SK; DEMO |
| | UTM 20 (EPSG:32620) | for M_SA |
| | S-JTSK (EPSG:5514/ESRI:102067) (locally CZ/SK coord.s.) | for M_CZ; M_CZ_BD; M_CZ_KM |

Sample:

https://wms.position.cz/data/XXXX/YYYY/?Version=1.1.1&REQUEST=GetMap&LAYERS=M_CZ&STYLES=&SRS=EPSG:32633&BBOX=458419.200000026,5547360.00000509,458825.600000026,5547766.40000509&WIDTH=256&HEIGHT=256&FORMAT=image/png&BGCOLOR=0xFFFFFFFF



Response to GetMap request

https://wms.position.cz/data/XXXX/YYYY/?Version=1.1.1&REQUEST=GetMap&LAYERS=M_CZ&STYLES=&SRS=EPSG:102067&BBOX=-780288,-1170432,-650240,-1040384&WIDTH=256&HEIGHT=256&FORMAT=image/png&BGCOLOR=0xFFFFF

STATIC MAP IMAGES

The access to WMS Position - Maps service enables also creation of static map images and putting end-user points, lines and areas in it.

The access is possible by classical access parameters or simply by specification in URL address (must be allowed):

A) <https://wms.position.cz/staticmap?user=XXXX&pass=YYYY>

B) <https://wms.position.cz/staticmap/XXXX/YYYY/> (/name/password)

The service is available via **http** protocol too.

The access security is resolved by Username and Password. Can be allowed only for list of domains. Registration data are identical for WMS Position (GIS) as well as for creation of static map images.

By default the static cut-outs provide data in **UTM33** projection. For Mercator or other coordinate systems SRS parameter must be specified.

Call parameters:

center=<string_searching> enter the coordinate (default WGS-84 or any other support projection – see next) or sought string (city, road, address - e.g. „Brno, Orechovska“). In case of ambiguity the first found result is shown.

Sample: *center=Praha,Biskupcova 15 in encode form, or coordinates,„center=50;14.5“*



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scale=<scale> (min|max|<scale>, e.g.<scale>=100000).

Default scale set of Navteq data is 1:1mil., 1:500 000, 1:200 000, 1:75 000, 1:25 000, 1:12 500, city maps 1:10 000. Out of default scale the maps will be zoomed.

w=<width of image in pixels>, **h**=<height of image in pixels > or the definition of **size**=< width >x< height >

dpi=<dpi> (DPI of output, default: 200, for mapping to other DPI)

format=JPEG|GIF|PNG|BMP|WBMP|image/jpeg|image/...

user=<user> - authorization for WMS Position, **apass**=<password> - authorization for WMS Position

layers=<layer1>;<layer2>;... visible layers (optional, according to the relevant specification WMS Position GIS). If the queries contain this parameter and the map background for the relevant layer exist in multiple systems of coordinates, the map background in the required system of coordinates may be selected by means of the following parameter:

srs=<epsg code of the layer system of coordinates>e.g. „*epsg: 102067*“ (optional parameter).

bgcolor=<background color> (optional, according to the relevant specification WMS Position GIS)

grayscale=y|n

icons=[<icon/style>]|<coordinate1>|<coordinate2>|... (coordinates of one or more icons)

possible definition via address **icons**=[<icon/style>]|<string_searching>|

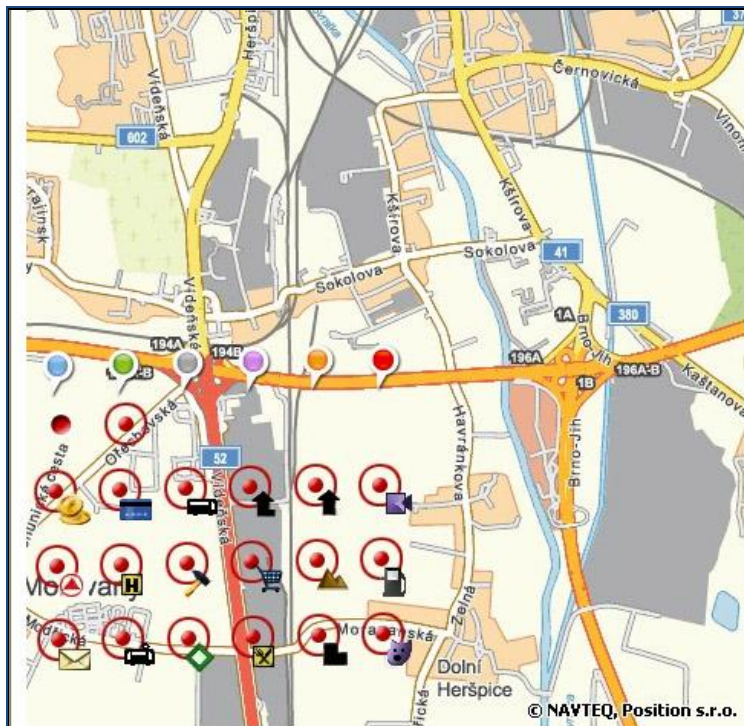
icons=style:ic@point2|49;15|49.6;14.3|style:ic@point3|49;15|49.6;14.3

icons=style:ic@point2|praha, londynska 45|style:ic@point3|praha, belgicka 22

note.: ic – id, name of icone, style is optional

more icons are set apart by the signs „|”

Available styles and vizualization of point symbols - icons:



pin_blue, pin_green, pin_grey, pin_magenta, pin_orange, pin_red

point2, point3

Point_Bank, Point_Bankomat, Point_Bus, Point_Castle, Point_Chateau, Point_Cinema

Point_CrossBorder, Point_Hotel, Point_Industry, Point_Market, Point_Mount, Point_Petrol

Point_Post, Point_Rail, Point_Reserv, Point_Restaurant, Point_Ruin, Point_Theatre, Point_Tower

lines=style:w@4,c@0x990000FF|49;15|49.6;14.3| |

Pozn.: w-width, c-color, p-projection, joints of line are set apart by the sign „|”

polygons=style:w@4,c@0x990000FF,fc@0x990000FF|49;15|49.6;14.3|49;16| |

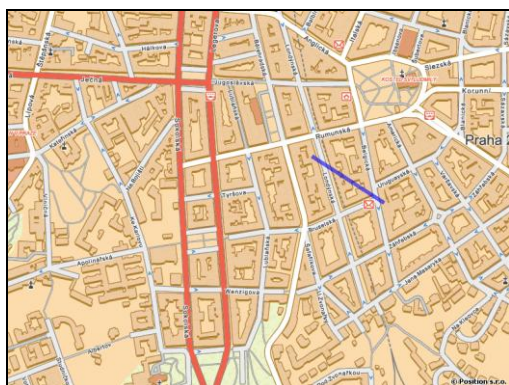
Pozn.: w-border width, c-border color, fc-fill color, p-projection (e.g. JTSK,UTM,S-42, WGS84..), style is optional.

More lines or polygons are set apart by the signs: „||”

The line or polygon joints may be defined instead of coordinates by the search string, e.g.

lines=style:w@6,c@0x990000FF|praha, londynska 45|praha, belgicka 22| |

<https://wms.position.cz/staticmap/XXXX/YYYY/?format=png¢er=praha,lublanska&size=800x600&scale=12500&lines=style:w@6,c@0x990000FF|praha,londynska 45|praha,belgicka 22>



Line definition by means of addresses

Color: Color always starts by prefix "0x", follows 6-or 8-figure hexadecimal number in RGB form. In case of 8-figure number, the first two numbers determines the color transparency. 00 means full transparency, FF means full color.

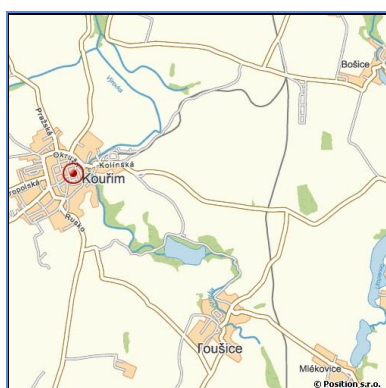
Coordinate systems:

Default system is WGS-84, nevertheless further coordinate systems may be used (e.g. S-42, JTSK, UTM). If such coordinate system is used, its name is necessary to mention:

icons=style:ic@point2|50;15|49.6;15.1|| *default WGS-84*
icons=style:ic@point3|JTSK; 703 011; 1 058 147|JTSK; 758 882,20; 1 095 518,77|| *system S-JTSK*

Sample Web Mercator projection + JTSK center definition:

<https://wms.position.cz/staticmap/xxxx/yyyy/?format=jpeg&srs=epsg:3857¢er=JTSK; 703 011; 1 058 147&size=500x500&scale=75000&icons=JTSK; 705 511; 1 058 147>



Response to "staticmap" query defined in JTSK system of coordinates

Default setup of the application:

If no style to parameter is set, the service is called only by coordinate:

For icons: id=point3 (red point)

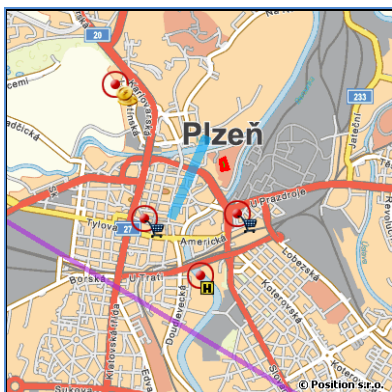
For lines: w=4,c=0xFF000000 (black line width 4)

For polygons: w=4, c=0xFF000000, fc=0xFF000000 (black polygon, boundary line width 4)

Projection: WGS-84

Sample of the Service call setup:

```
https://wms.position.cz/staticmap?ouser=xxxx&apass=yyyy&format=gif&layers=MC_CZ&center=plzen&size=400x400&scale=75000&icons=style:ic@Point_Market|49°B044%2740.52%22N;13°B022%2730.48%22E|49°B044%2742.81%22N;13°B023%2716.09%22E|/style:ic@Point_Bank|49°B045%2723.08%22N;13°B022%2715.09%22E|/style:ic@Point_Hotel|UTMZone33;383496.10;5510941.80&lines=style:c@0x99AA22DD,w@5|49.755327%B0N;13.326260%B0E|49.728493%B0N;13.399054%B0E|/style:c@0x9900AAFF,w@10|49.745101%B0N;13.378067%B0E|49.752475%B0N;13.382756%B0E&polygons=style:c@0xFF0000,fc@0x00FF00|49.750361%B0N;13.384677%B0E|49.750539%B0N;13.385199%B0E|49.749632%B0N;13.385670%B0E|49.749507%B0N;13.384881%B0E|49.750361%B0N;13.384677%B0E
```



WMTS POSITION (WEB MAP TILE SERVICE)

WMTS POSITION is a web application based on WMS service.

Compared to WMS, WMTS Position has a simplified interface for calls from the client side. The client does not need to carry out complex conversions of real coordinates for each required cut-out of the map to get the required size of the cut-out, as it is only necessary to specify the row and the line of the predefined matrix of complete map in the relevant scale. Another simplification of service calling compared to WMS is the fact that each query may only contain one layer¹. Definition of ID layers are identical to WMS service.

Standard setting for WMTS server:

Implemented version of WMTS specification: **1.0.0** (at the moment the only released specification, i.e. default for the service).

WMTS Position server provides map cut-outs or tiles of size **256 x 256 px** at resolution **200dpi**

More detailed information about the service configuration can be found by means of "GetCapabilities" command.

Predefined sets of matrices are available via URL request:

<https://wms.position.cz/data/XXXX/YYYY/?REQUEST=GetCapabilities&service=wmts>

Set of matrices are depending on Layers and available coordinate systems.

For example layer **M_EU** offer following matrix identifiers:

| | |
|----------------------|-----------------------------|
| Mercator (EPSG:3857) | MATRIXSET_MER |
| UTM-33 (EPSG:32633) | MATRIXSET_EU2, MATRIXSET_EU |

M_CZ layer offer following matrix identifiers:

| | |
|----------------------|-----------------------------|
| Mercator (EPSG:3857) | MATRIXSET_MER |
| UTM-33 (EPSG:32633) | MATRIXSET_EU2, MATRIXSET_CZ |
| S-JTSK (EPSG:102067) | MATRIXSET_CZJTSK |

¹ Calling of multiple layers is not recommended even for WMS service as the correct overlay of objects (because of definition of layer themes) cannot be guaranteed, i.e. it is for example not possible to combine cadastral layer with tourist layer as each of them has its own theme. Only the theme for the last layer mentioned in the query (parameter "Layers") is displayed. Correctly the server should set semi-transparency of cut-outs for both themes overlaid in a single output - in a single image, which is however technologically impossible.

SAMPLE MATRICIES FOR UTM 33 COORDINATE SYSTEM

There are predefined sets of UTM 33 tile matrices - „TileMatrixSets“ for whole Europe (f.e. M_EU layer), Czech Republic (f.e. M_CZ layer) and Slovakia (f.e. M_SK layer), with the following identifiers: „**MATRIXSET_EU**“, „**MATRIXSET_EU2**“, „**MATRIXSET_CZ**“, „**MATRIXSET_CZ2**“, „**MATRIXSET_SK**“.

Within the scope of these matrices "TileMatrices" are predefined corresponding to relevant scales:

For Europe matrix set (MATRIXSET_EU, MATRIXSET_EU2, MATRIXSET_CZ2) the following applies:

- TopLeftCorner: -1700000 8000000

For Czech Republic matrix set (MATRIXSET_CZ) the following applies²:

- TopLeftCorner: 292600 5656300

For Slovakia matrix set (MATRIXSET_SK) the following applies²:

- TopLeftCorner: 635000 5505500

Table 1 - Identificators of matrices and their dimensions within the relevant set (for tile size 256x256px)

| Scale | MatrixID pro set MATRIXSET_EU (MatrixWidth / MatrixHeight) | MatrixID pro set MATRIXSET_CZ (MatrixWidth / MatrixHeight) | MatrixID pro set MATRIXSET_SK (MatrixWidth / MatrixHeight) | Remark (resolution) |
|----------------|---|---|---|------------------------|
| 1 : 20 000 000 | EU_20m (7 / 7) | CZ_20m (7 / 7) | SK_20m (7 / 7) | 2540 m/px |
| 1 : 6 200 000 | EU_6m (20 / 21) | CZ_6m (20 / 21) | SK_6m (20 / 21) | 762 m/px |
| 1 : 3 000 000 | EU_3m (41 / 42) | CZ_3m (41 / 42) | SK_3m (41 / 42) | 381 m/px |
| 1 : 1 000 000 | EU_1m (124 / 130) | CZ_1m (15 / 9) | SK_1m (13 / 7) | 127 m/px |
| 1 : 500 000 | EU_500t (247 / 259) | CZ_500t (30 / 18) | SK_500t (26 / 14) | 63.5 m/px |
| 1 : 200 000 | EU_200t (616 / 646) | CZ_200t (75 / 43) | SK_200t (65 / 34) | 25.4 m/px |
| 1 : 75 000 | EU_75t (1641 / 1723) | CZ_75t (200 / 115) | SK_75t (172 / 89) | 9.525 m/px |
| 1 : 25 000 | EU_25t (4922 / 5168) | CZ_25t (599 / 343) | SK_25t (514 / 266) | 3.175 m/px |

² Except for overview maps, i.e. except for scales 1:20m, 1:6,2m and 1:3m. For overview maps TopLeftCorner is considered as being identical to set of matrices for the whole Europe, i.e. -1700000 8000000.

| | | | | |
|------------|---------------------|---------------------|---------------------|-------------|
| 1 : 12 500 | EU_12t (9843/10335) | CZ_12t (1198 / 686) | SK_12t (1028 / 531) | 1.5875 m/px |
| 1 : 6250 | EU_6t (19686/20670) | CZ_6t (2396 / 1371) | SK_6t (2055 / 1061) | 0.79 m/px |
| 1 : 5000 | - | CZ_5t (2994 / 1714) | - | 0.63 m/px |

SAMPLE MATRICIES FOR UTM 20 COORDINATE SYSTEM

There is predefined tile matrice for South America „**MATRIXSET_SA**“ for M_SA layer.

For South America(MATRIXSET_SA) the following applies:

- TopLeftCorner: -2755000 1629000

Table 2 - Identificators of matrice of South America and their dimensions within the relevant set (for tile size 256x256px)

| Scale | MatrixID pro set MATRIXSET_SA (MatrixWidth / MatrixHeight) | Remark (resolution) |
|----------------|---|------------------------|
| 1: 50 000 000 | SA_50m (5 / 5) | 6350 m / px |
| 1 : 20 000 000 | SA_20m (13 /13) | 2540 m/px |
| 1 : 6 200 000 | SA_6m (40 /40) | 762 m/px |
| 1 : 3 000 000 | SA_3m (82 /82) | 381 m/px |
| 1 : 1 000 000 | SA_1m (246 / 246) | 127 m/px |
| 1 : 500 000 | SA_500t (491 / 491) | 63.5 m/px |
| 1 : 200 000 | SA_200t (1228 /1228) | 25.4 m/px |
| 1 : 75 000 | SA_75t (3273 / 3273) | 9.525 m/px |

| | | |
|------------|------------------------|-------------|
| 1 : 25 000 | SA_25t (9818/ 9818) | 3.175 m/px |
| 1 : 12 500 | SA_12t (19636 / 19636) | 1.5875 m/px |
| 1 : 6 250 | SA_6t (39272/ 39272) | 0.79 m/px |

SAMPLE MATRICE FOR WEB MERCATOR COORDINATE SYSTEM

There is predefined tile matrice „**MATRIXSET_MER**“ for any layer defined with these coordinate system.

For web mercator (MATRIXSET_MER) the following applies:

- TopLeftCorner: -20037508.34 20037508.34

Table 3 - Identificator of web mercator matrice and their dimensions within the relevant set (for tile size 256x256px)

| Approx. Scale | MatrixID pro set MATRIXSET_MER (MatrixWidth / MatrixHeight) | Remark |
|----------------|--|--------|
| 1: 100 000 000 | Z3_100M (13 / 13) | |
| 1 : 50 000 000 | Z5_50M (25 /25) | |
| 1 : 20 000 000 | Z6_20M (62 /62) | |
| 1 : 9 629 842 | Z7 (129 /129) | |
| 1 : 4 814 921 | Z8 (257 / 257) | |
| 1 : 2 407 460 | Z9 (513 / 513) | |
| 1 : 1 203 730 | Z10 (1025 /1025) | |
| 1 : 601 865 | Z11 (2049 / 2049) | |



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| | | |
|-------------|----------------------|---------|
| 1 : 300 932 | Z12 (4097/ 4097) | |
| 1 : 150 466 | Z13 (8193 / 8193) | |
| 1 : 75 233 | Z14 (16385/ 16385) | |
| 1 : 37 616 | Z15 (32769/ 32769) | |
| 1 : 18 808 | Z16 (65537/ 65537) | |
| 1 : 9 403 | Z17 (131076/ 131076) | locally |

Example of calling the map cut-out:

https://wms.position.cz/data/XXXX/YYYY/?request=gettile&service=wmts&version=1.0.0&layer=M_EU&style=default&format=image/jpeg&tilematrixset=matrixset_mer&tilematrix=Z10&tilerow=350&tilecol=531

INFORMATION ABOUT POSITION'S SERVICES

WMS Position - MAPS – street level Europe (or South America) coverage (according NAVTEQ data actual coverage)

Position Services - SEARCH – finding addresses level Europe (or South America) coverage, according HERE (NAVTEQ) data actual coverage. Row or structured input, hint possibility

Position Services - REVERSE GEOCODING – street level geocoding, address level geocoding possibility, special data (route numbers, speed category, user's data etc..)

Position Services - ROUTING – street level routing

Position Services - TRUCK ROUTING – street level routing with Truck attributes

Position Services - ROUTE OPTIMIZATION – street level optimization with time windows (VRPTW)