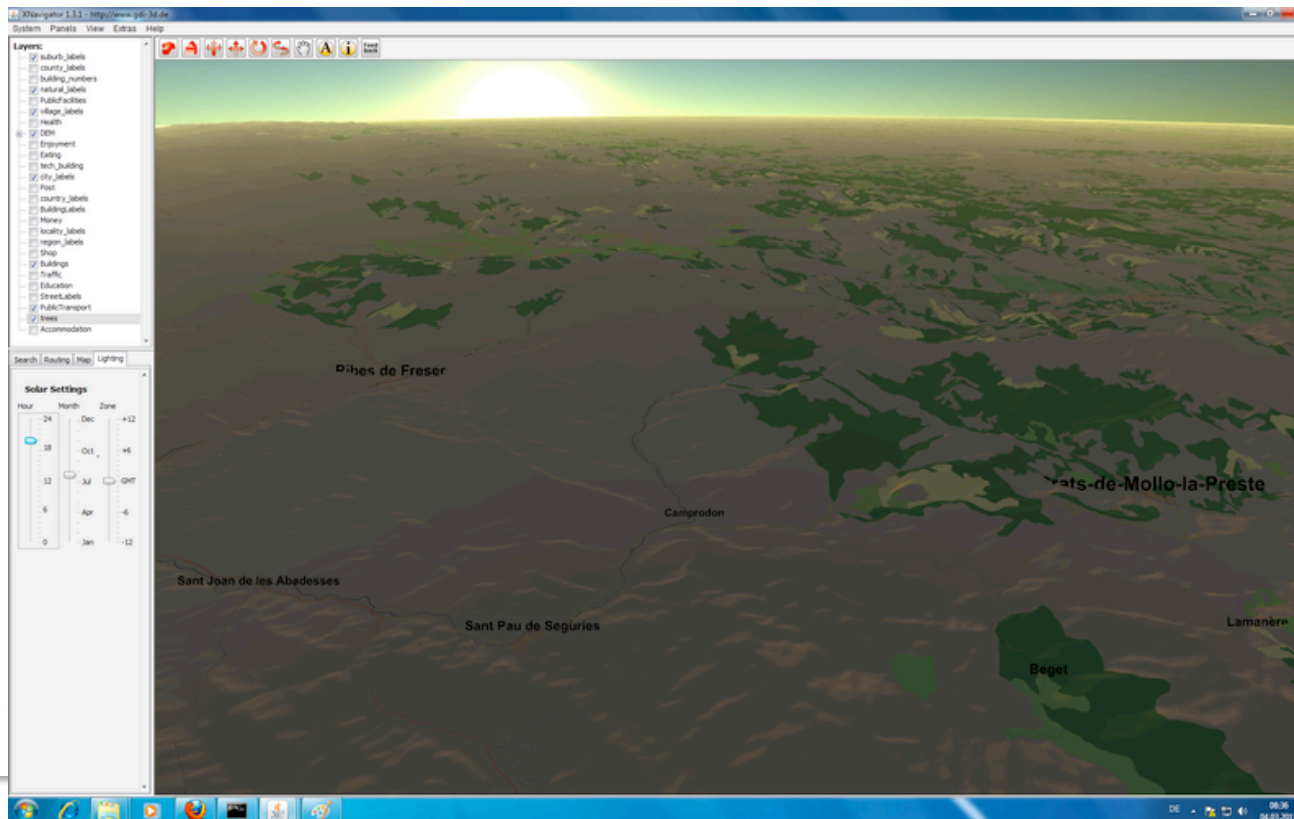


From OSM.planet to planet.OSM

www.osm-3d.dorg



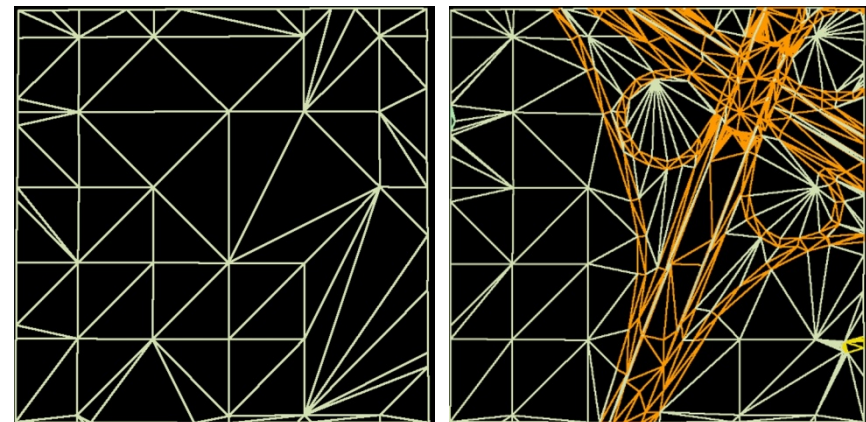
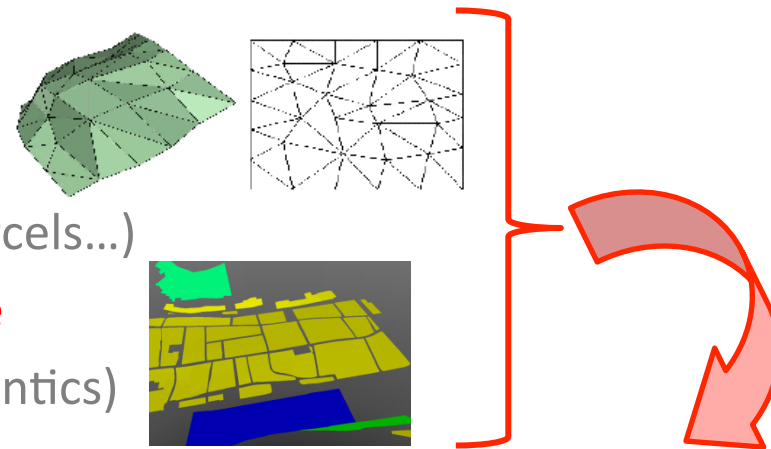
Alexander Zipf
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Department of Geography
University of Heidelberg
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<http://giscience.uni-hd.de>



Generating 3D landscape models

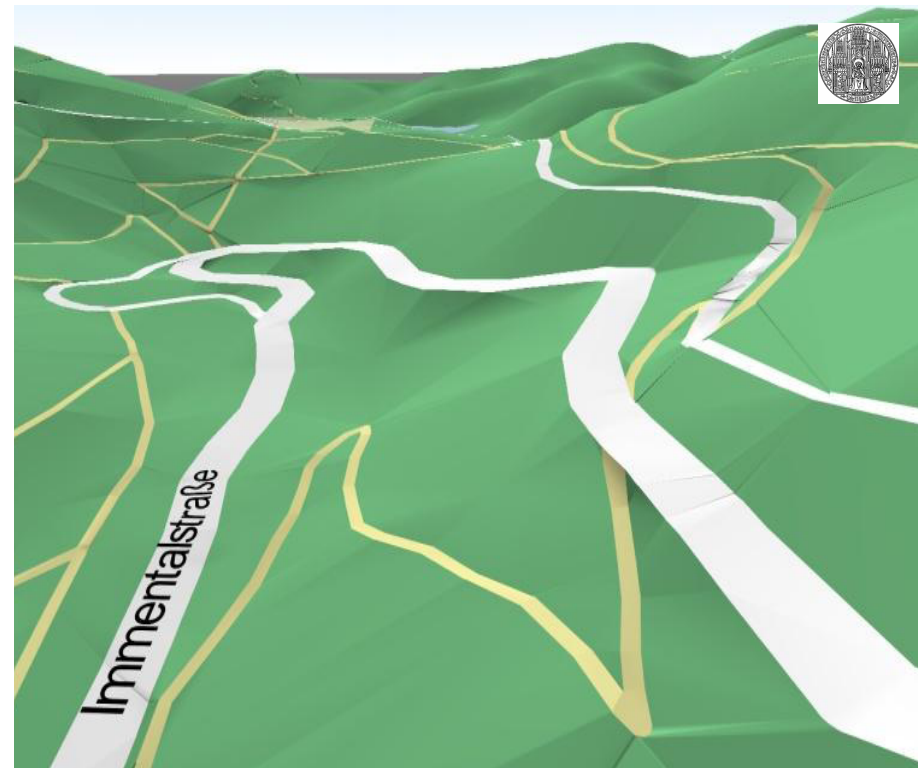
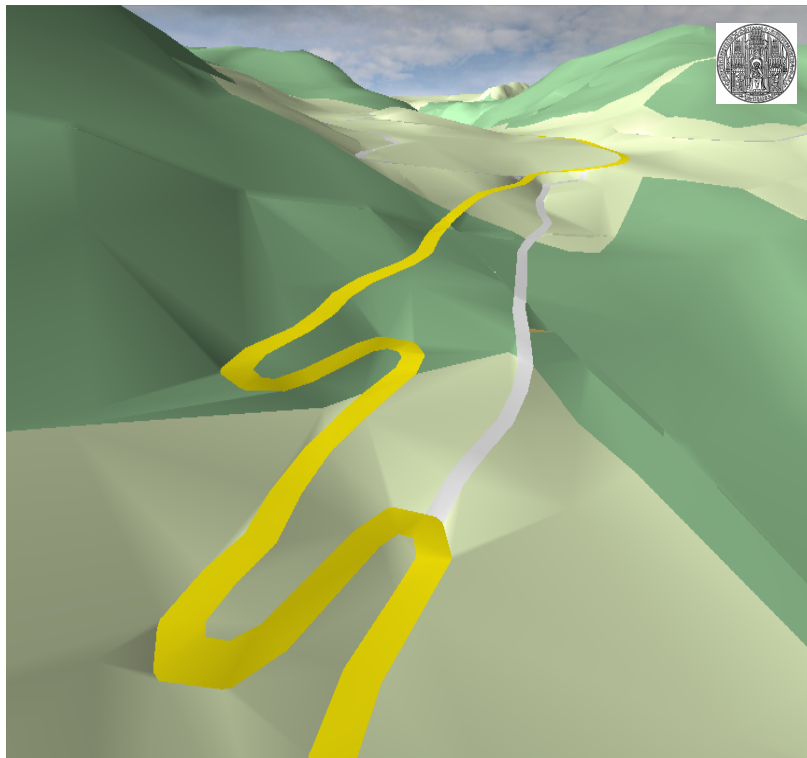
Combine heterogeneous data:

- 3D buildings (city model)
- digital elevation models (DEM)
 - **triangulated 3D points**
- Landuse (streets, water, forest, parcels...)
 - **2D vector data with landuse type**
 - aerial / satellite images (no semantics)
- other objects
 - trees, signs, street furniture
 - landmarks, POIS, ...



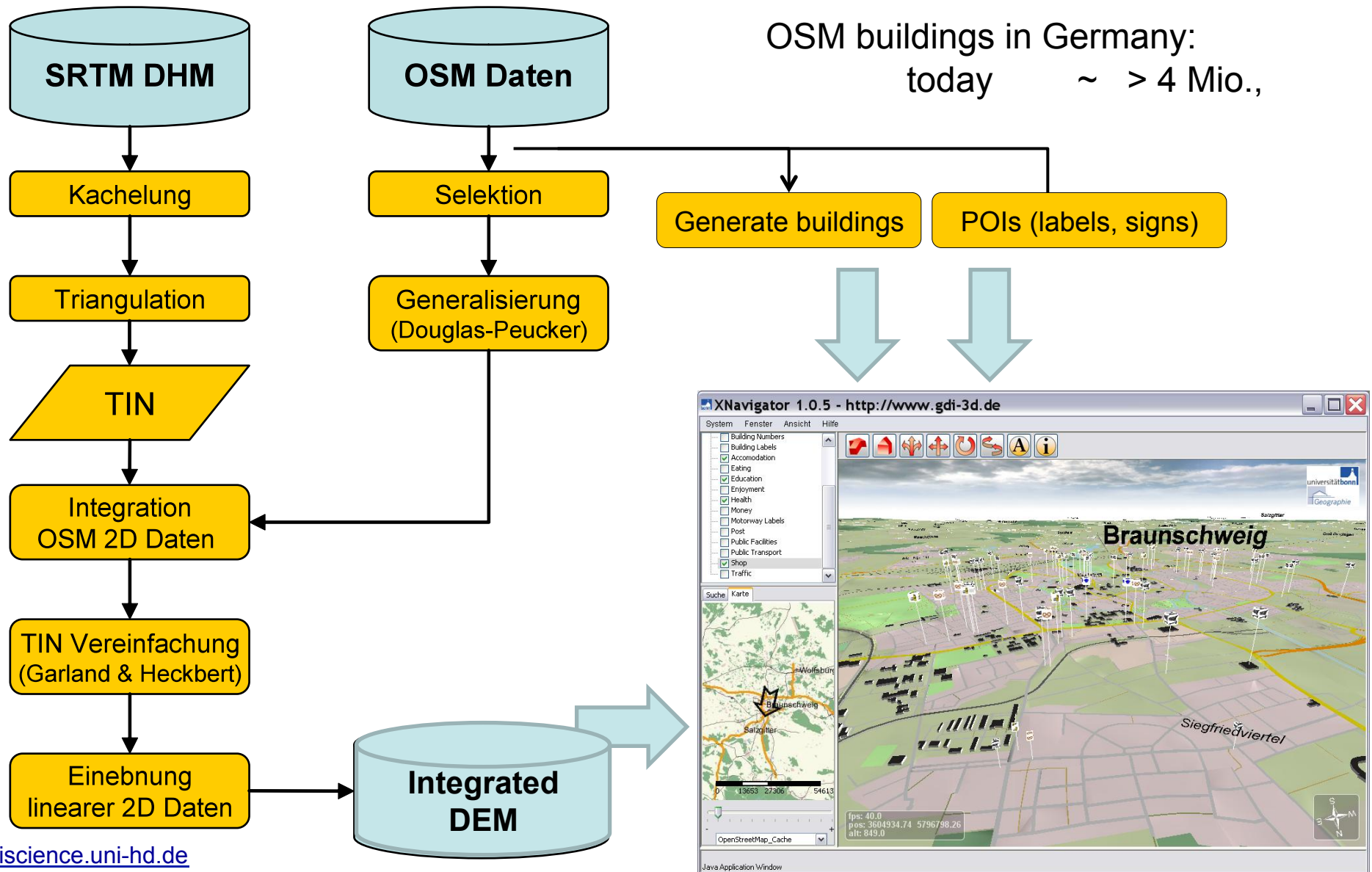
Smoothed streets in 90 meter DEM

- Adaptive flattening of streets improves original coarse DEM



(energy function dependend from land use moves triangles)

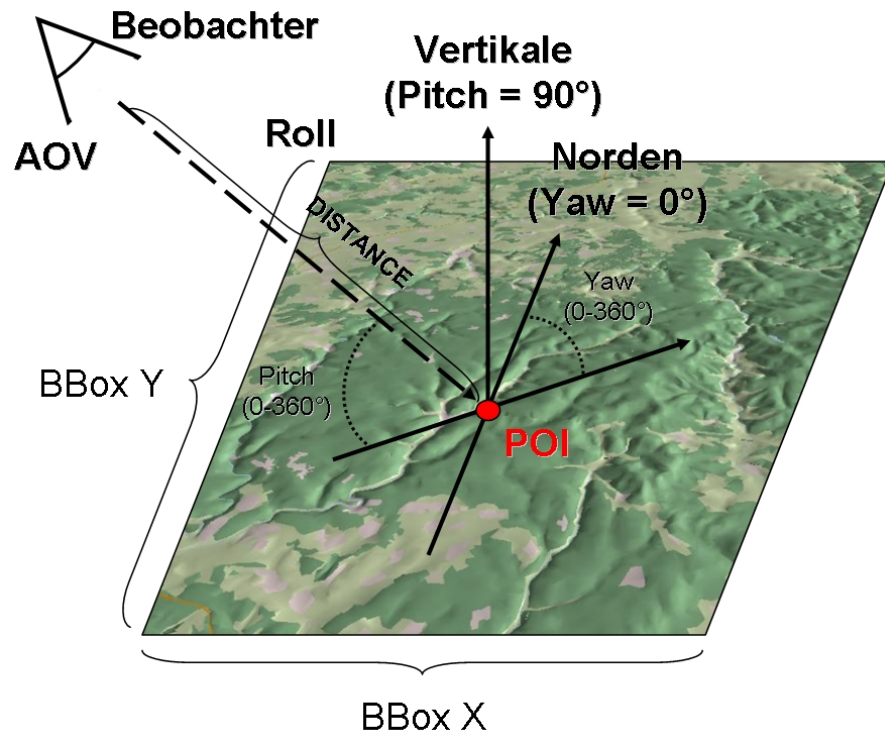
OSM-3D.org: OSM Landuse & SRTM DGM



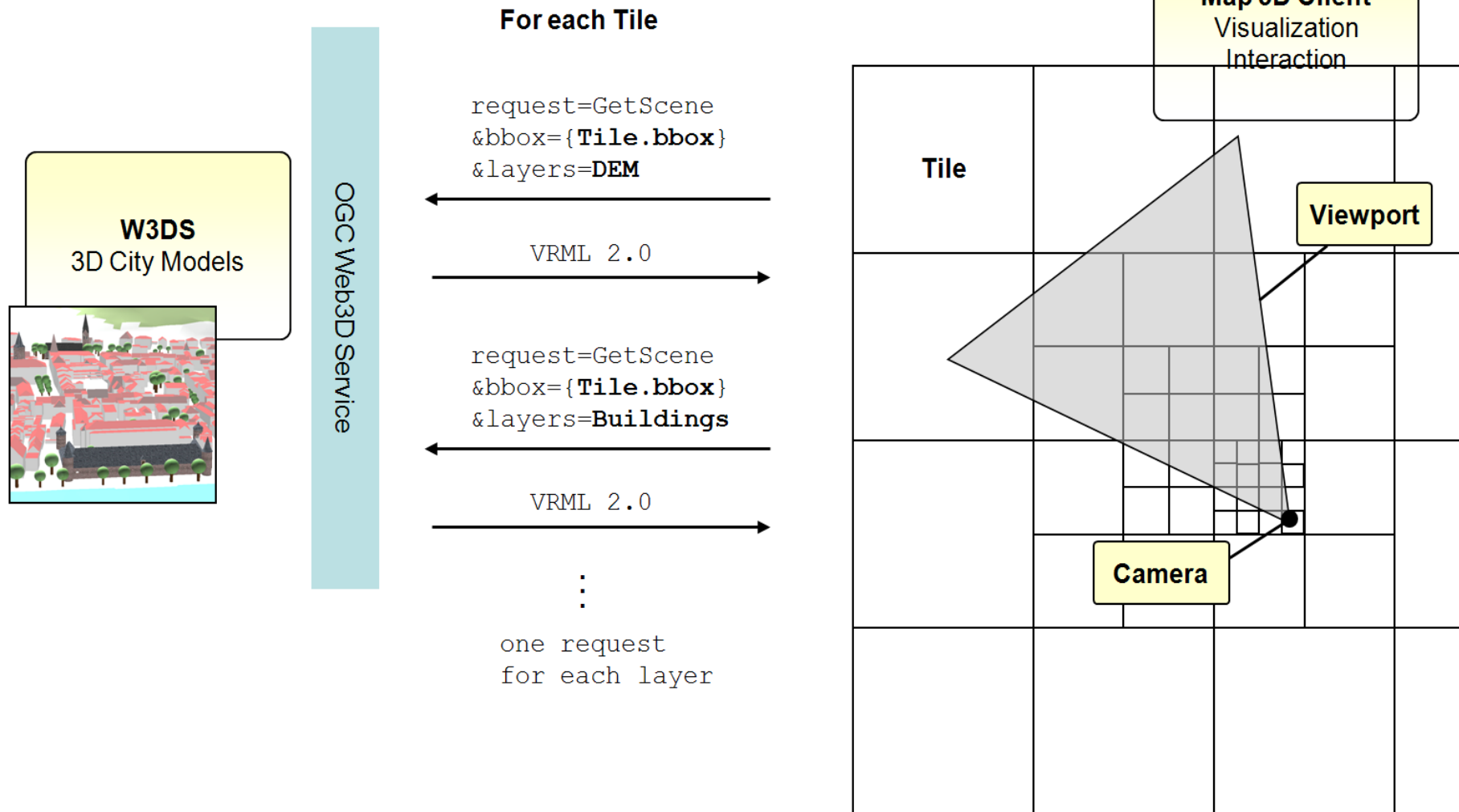
OGC Web 3D Service (W3DS) draft

- delivers 3D scenes
 - display elements
 - VRML, X3D, KML, Collada...
- imports 3D city models
- defined http interface

`http://myserver/w3ds?
request=GetScene&
bbox=3448244,5540223,3448582,5540495&
poi=3448410,5540385,0&
layers=trees,litfass,laterne,ampel,buildings,streets,rhein&
styles=tree,litfass,laterne,ampel,bisque,black,lake
&aov=45&pitch=45&roll=20&yaw=270&distance=80& ..`

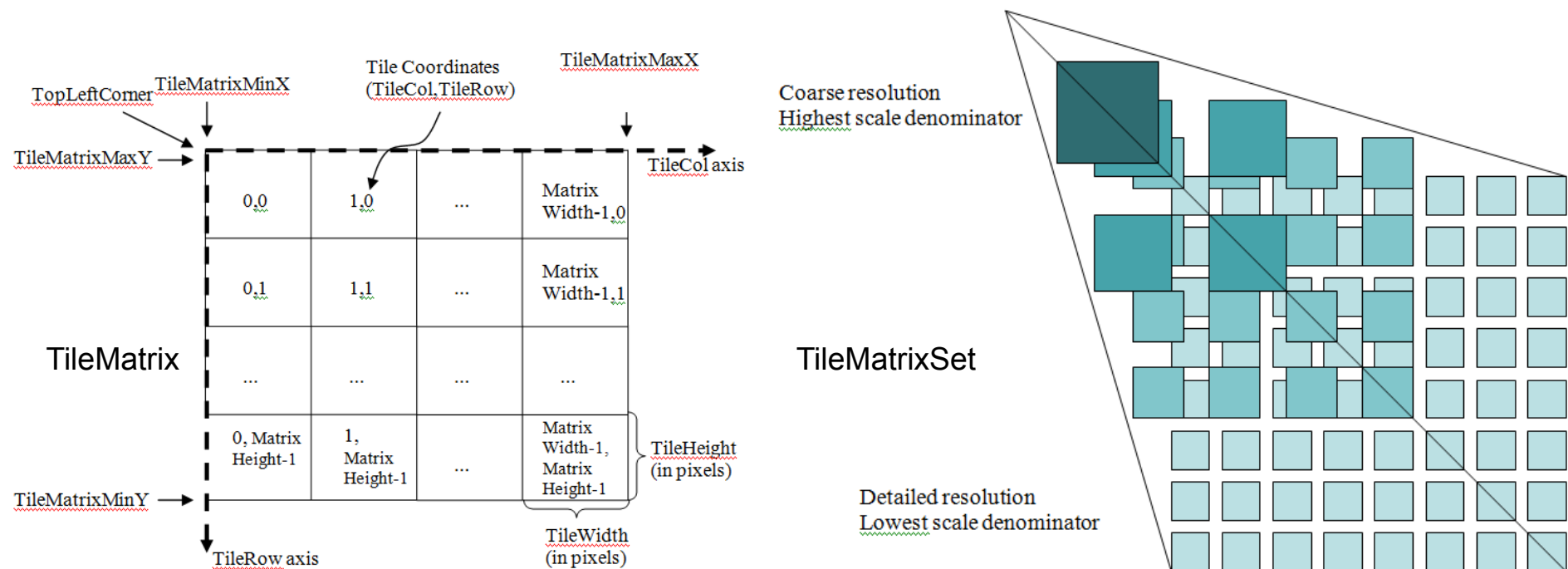


Support for streaming through tiling & view dependent level of detail (LOD)

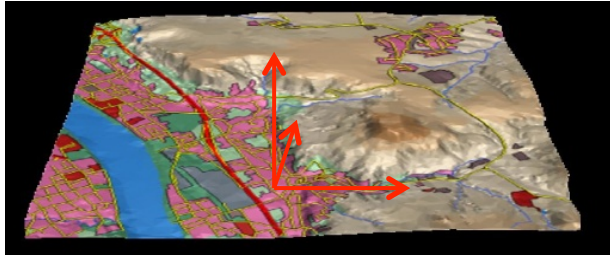


New OGC W3DS Spec draft: GetTile-Operation

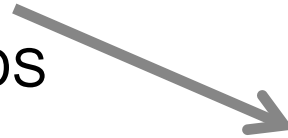
- Include definitions of TileMatrix and TileMatrixSet



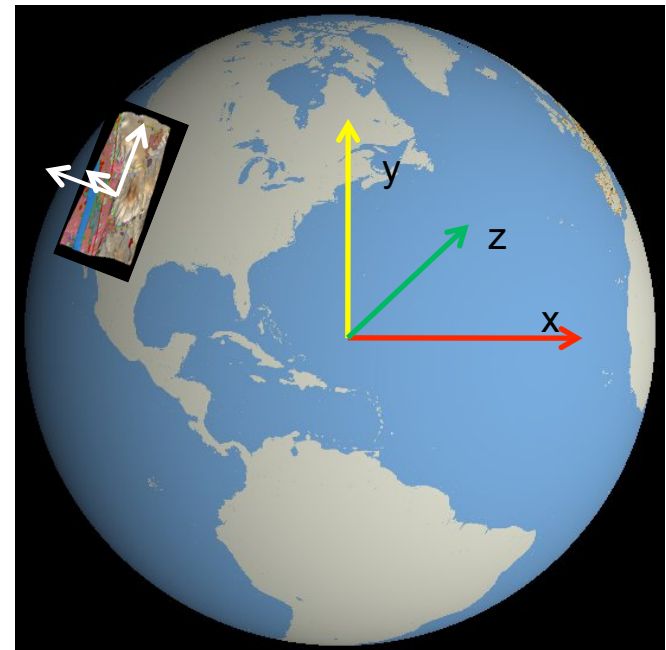
Scenegraph Transformations



Data as received from W3DS
in Map Projection CRS
(Spherical Mercator)



Data as displayed in the final
application in Cartesian
Coordinates



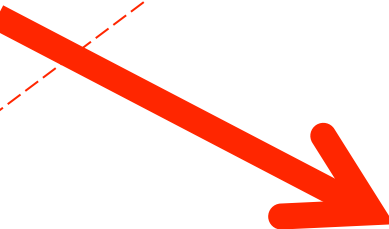
Scenegraph Transformations



Map origin

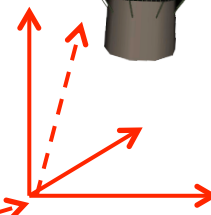
Spherical Mercator (Map Projection)

Transform

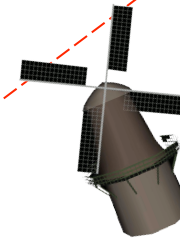


Cartesian Coordinates
(Globe)

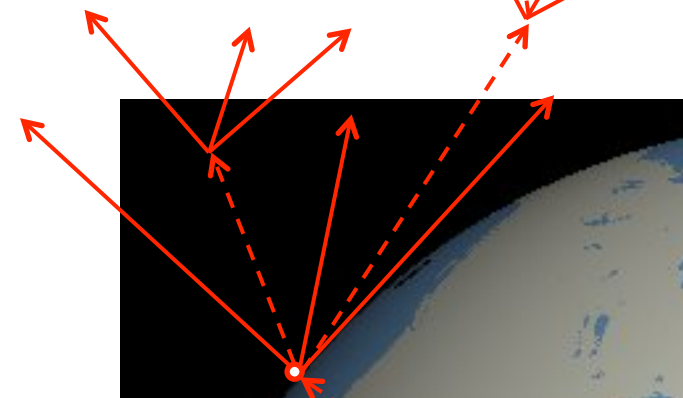
giscience.uni-hd.de



Shape in local
Coordinates



Shape in local
Coordinates

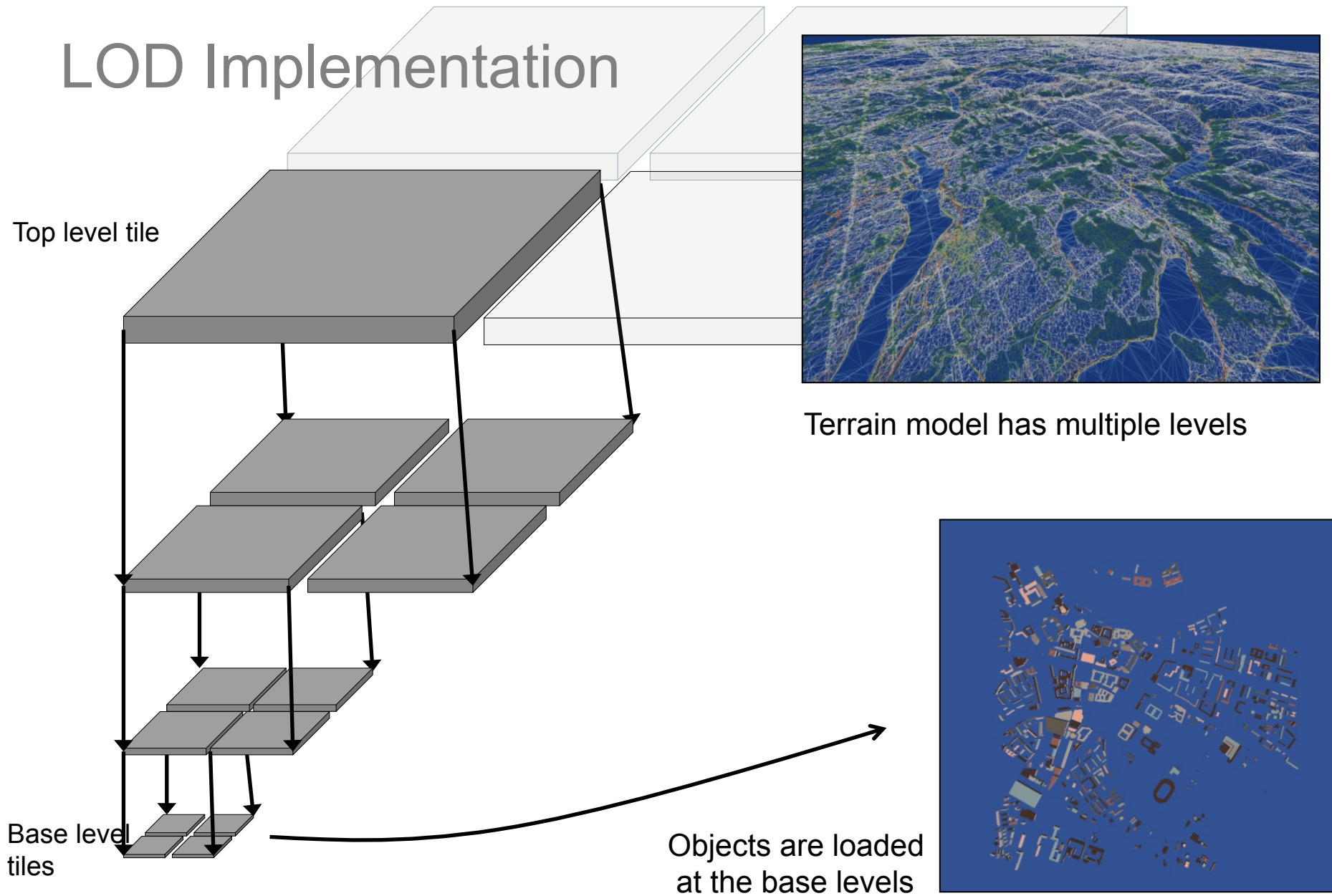


Tile
center

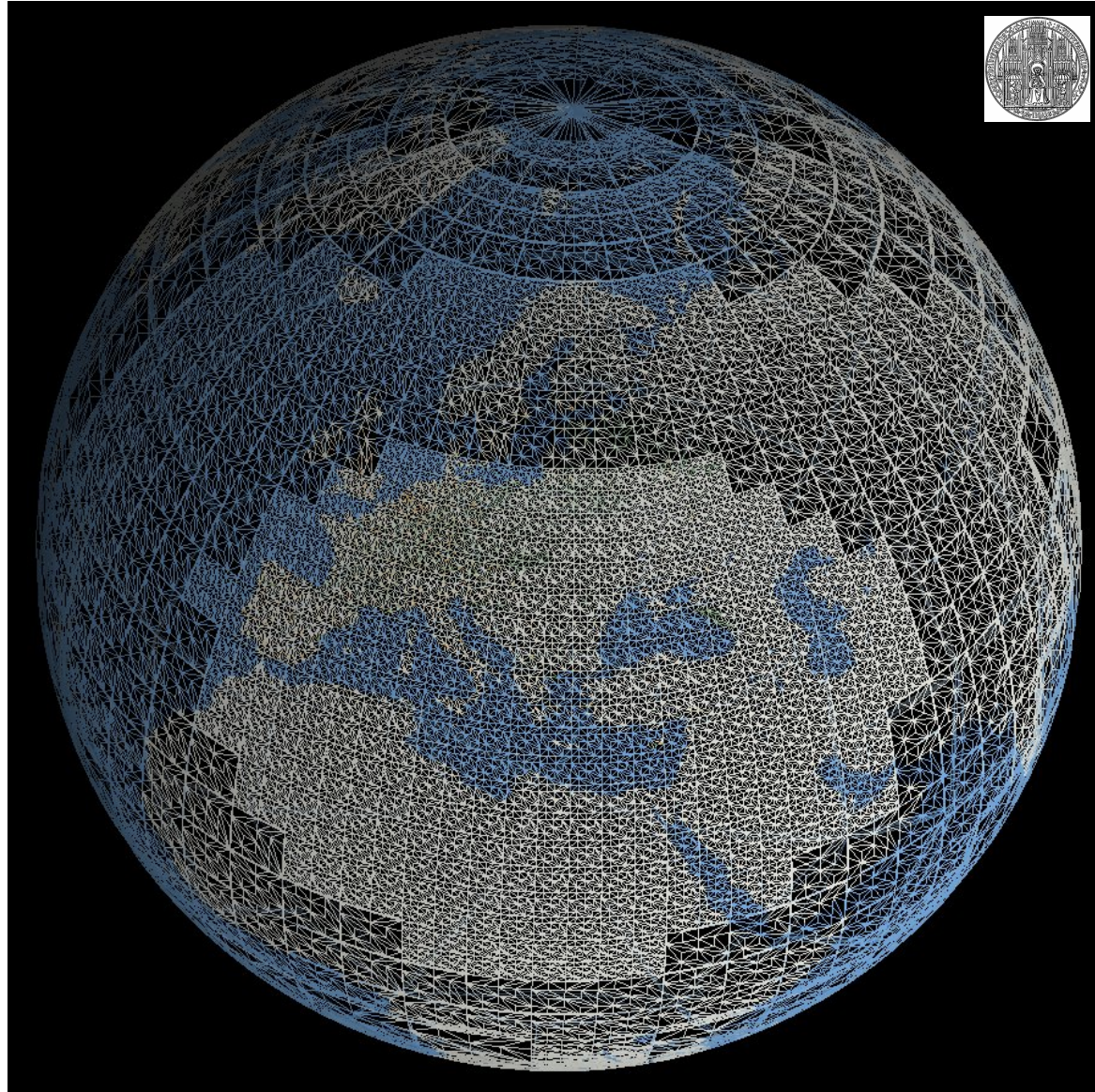
Transform

World origin =
earth center

LOD Implementation



LOD Implementation

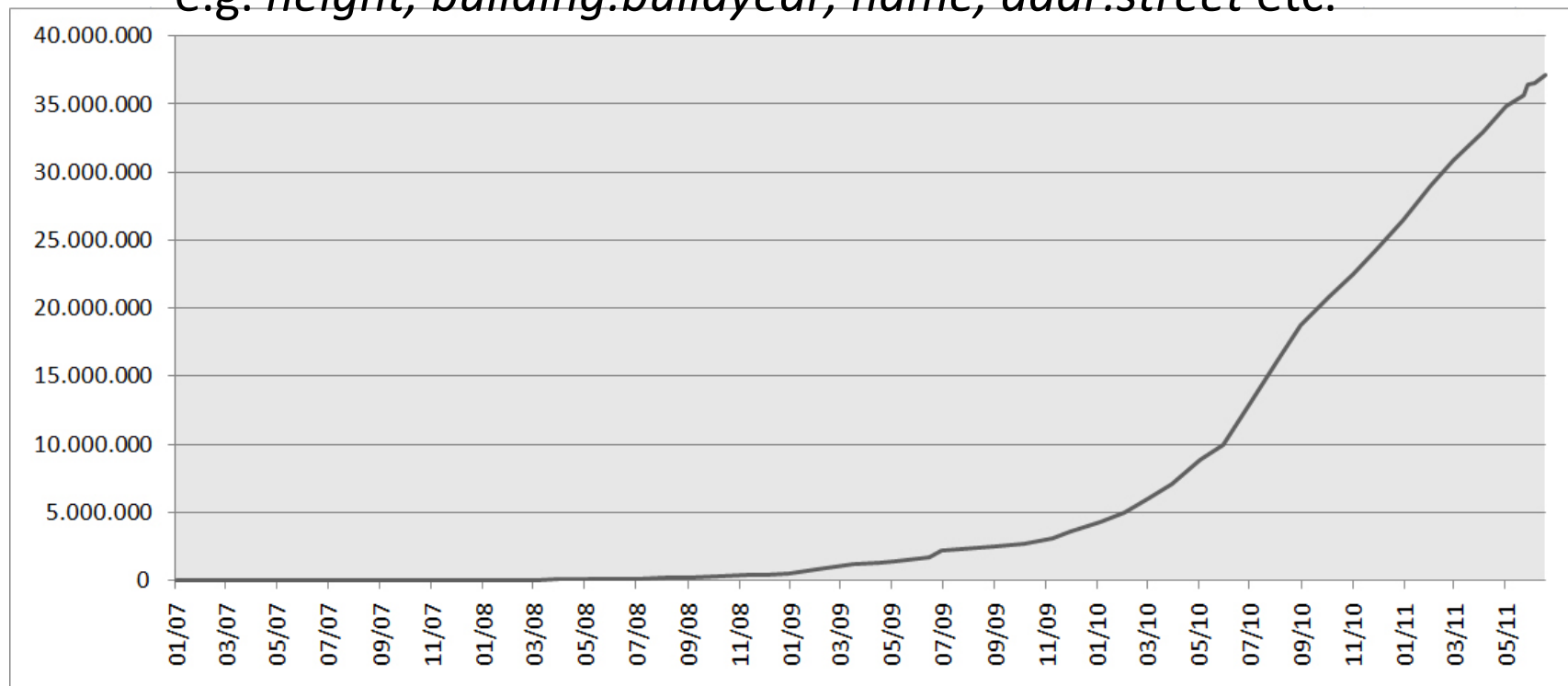


Tiles loaded into client

Buildings in OSM

- more and more buildings (*building=yes*)
- Bing Maps
- Additional information

e.g. *height, building:buildyear, name, addr:street* etc.



Modeling building:roofs

OSM key	Exemplary Value	Alternative
building:roof	tile, slate, flat, tile_red, reet	
building:roof:angle	30, 45, 10, 15	
building:roof:colour	grey, red, brown	building:roof:color
building:roof:material	shingles, slate, cardboard	
building:roof:orientation	along, across	
building:roof:extent	0.1, 0.3	
building:roof:ridge	yes	
building:roof:shape	pitched, hipped, flat, ridged	building:roof:style, building:roof:type



indorf Gröndorf
Munich

Hackenviertel





ms
apquest
erial
smarender
apnik

Beleuchtung

szzeit

Zone

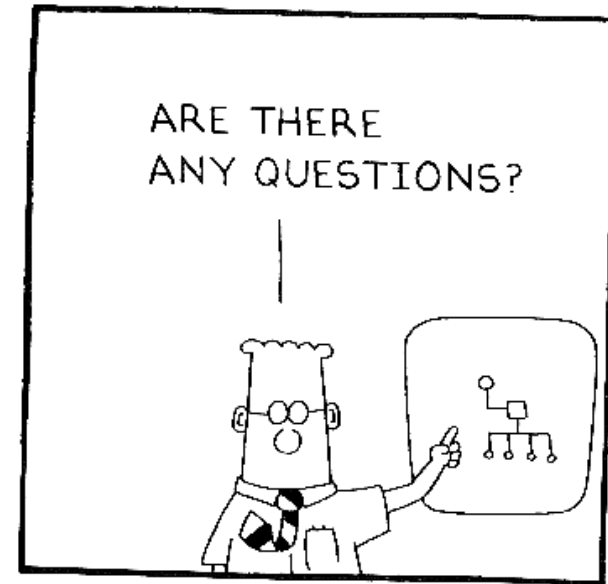
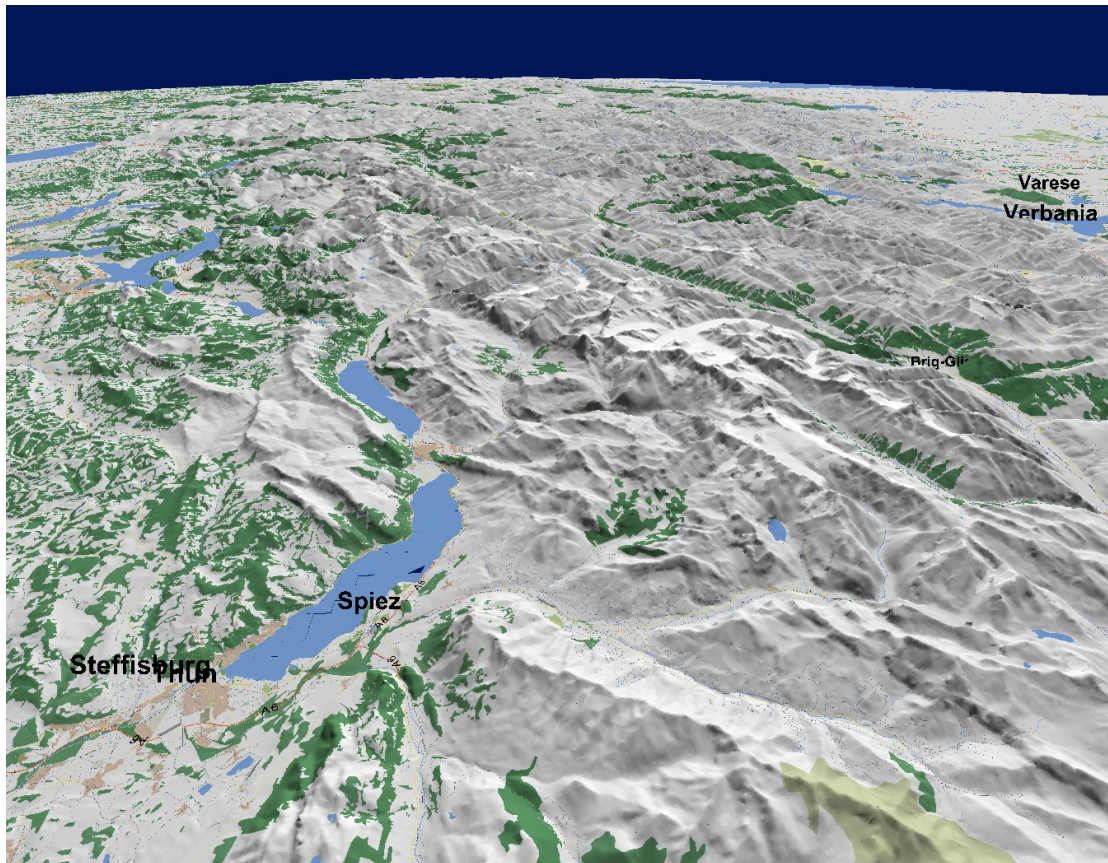
+12
+6
GMT
-6
-12



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Thank you very much!



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Hengstberger Symposium 2011

- **Towards Digital Earth - 3D Spatial Data Infrastructures**
- Heidelberg, September 7-8, 2011
- <http://www.geog.uni-heidelberg.de/lehrstuehle/gis/3dde.html>

