

3D City Models for Bonn, Berlin and Hamburg based on Open Source and Open Standards*

(*for download images have been compressed; quality decreased)



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lat/lon – short introduction

- Spin-Off University of Bonn, Nov. 2000
- SDI/OGC/ISO Competence + Free Software
- Consulting, Software development, Training
- deegree – Open Source implementation of several OGC/ISO-Standards
- Active OGC-Member
- Partner: Delphi IMM, EMPRISE, GDF, Intevation, map Topomatik

Agenda

- Motivation: Sample Images
- What happens there? - Explaining the architecture step-by-step
- Outlook
- Questions & Comments

Hamburg in Google Earth ...

Some Pictures from Bonn

Bonn on a Topographic Map



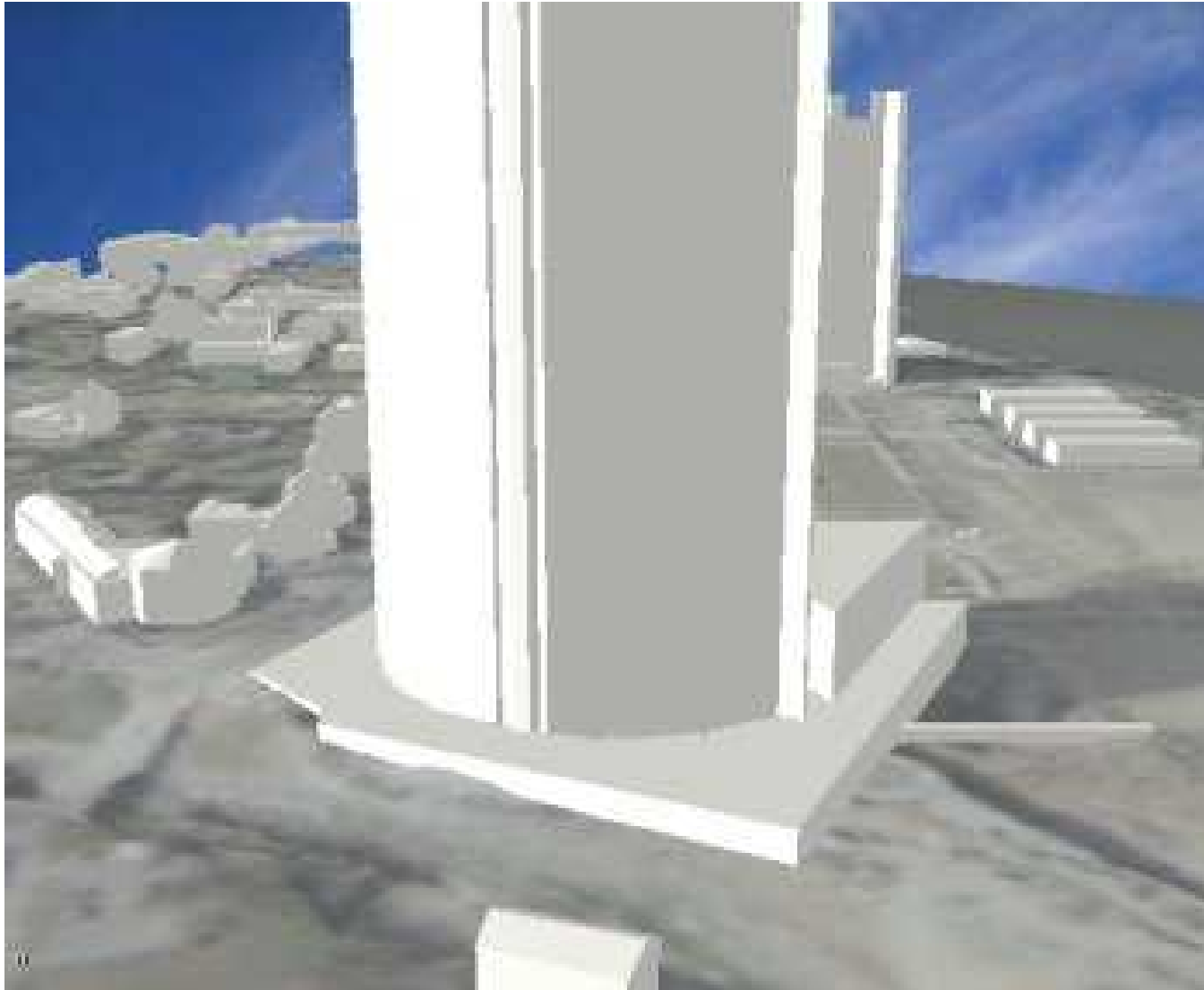
Bonn with Post/DHL-Tower



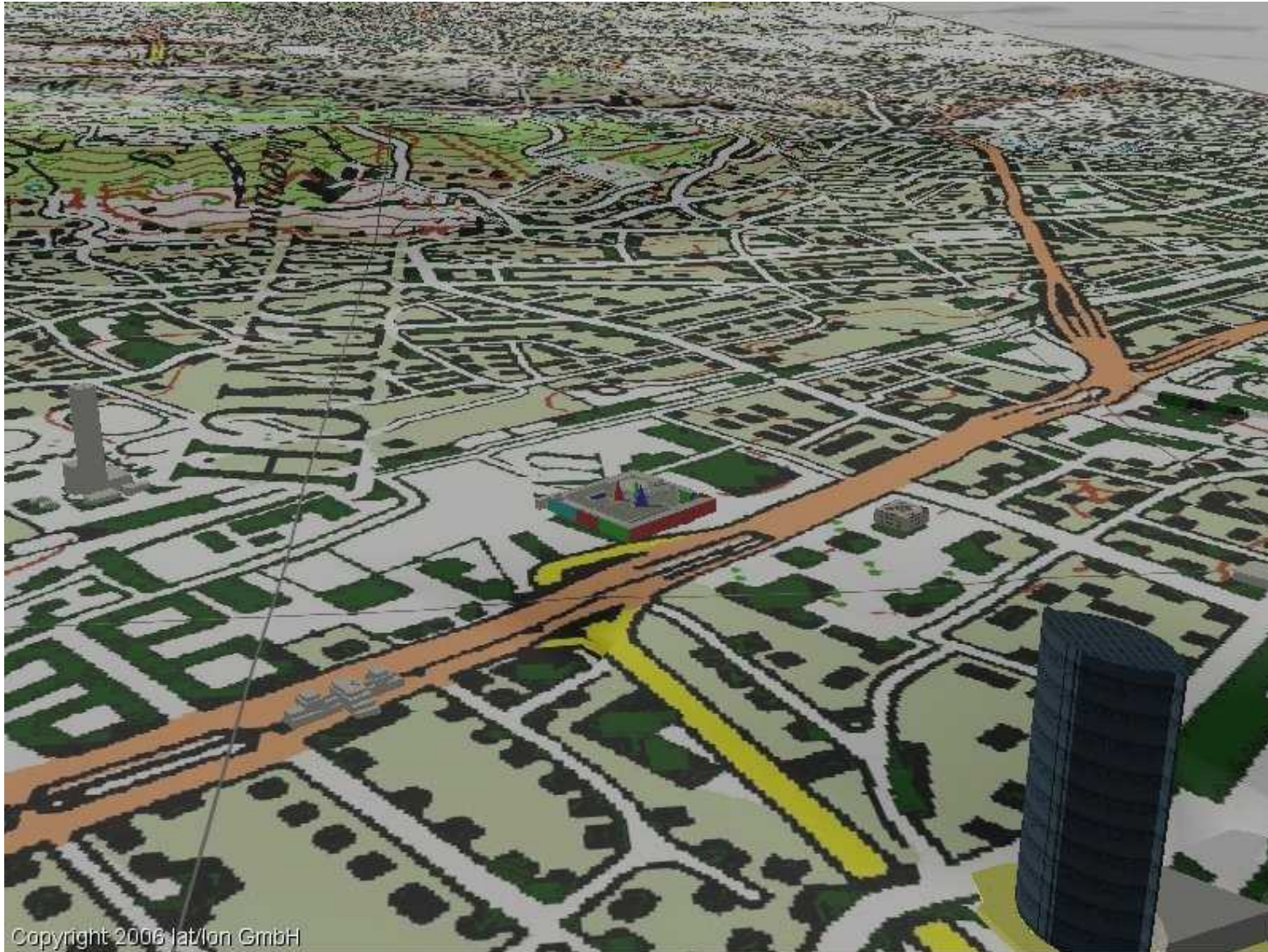
Bonn: Former Governmental Region



Bonn: Post/DHL Tower and Details



Bonn: Post/DHL Tower and Museum



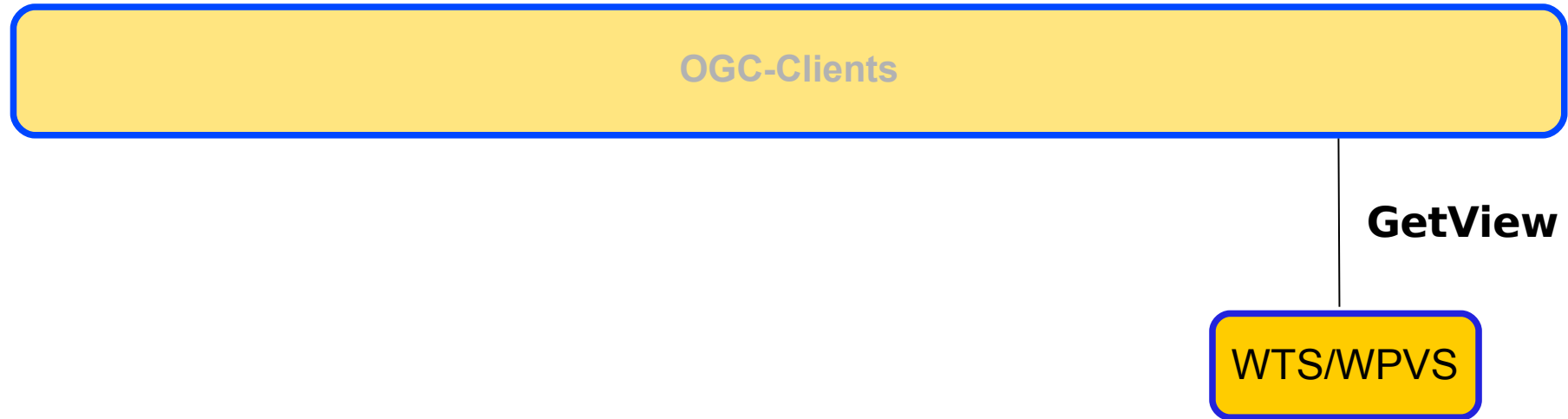
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Bonn: Using image-based Textures

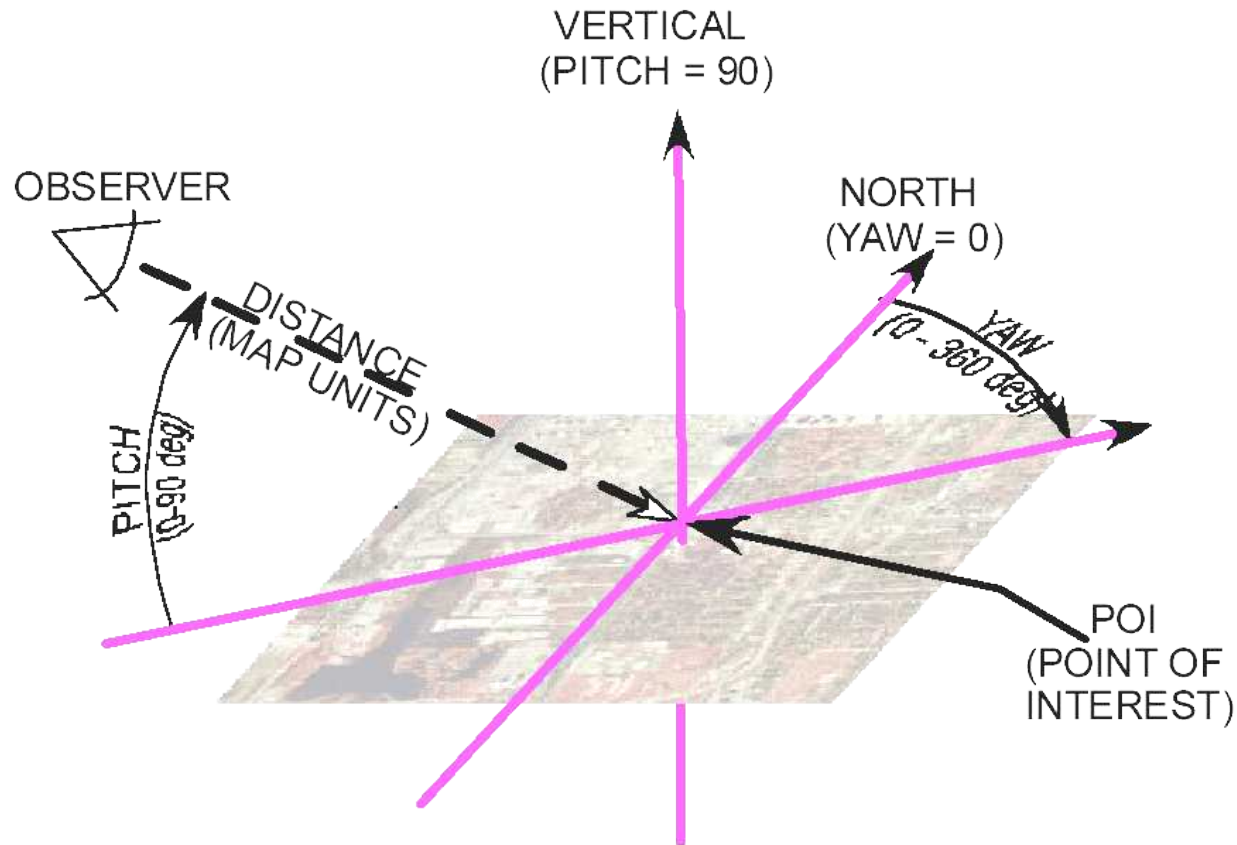


What's happening behind the curtain?

Components so fare ...

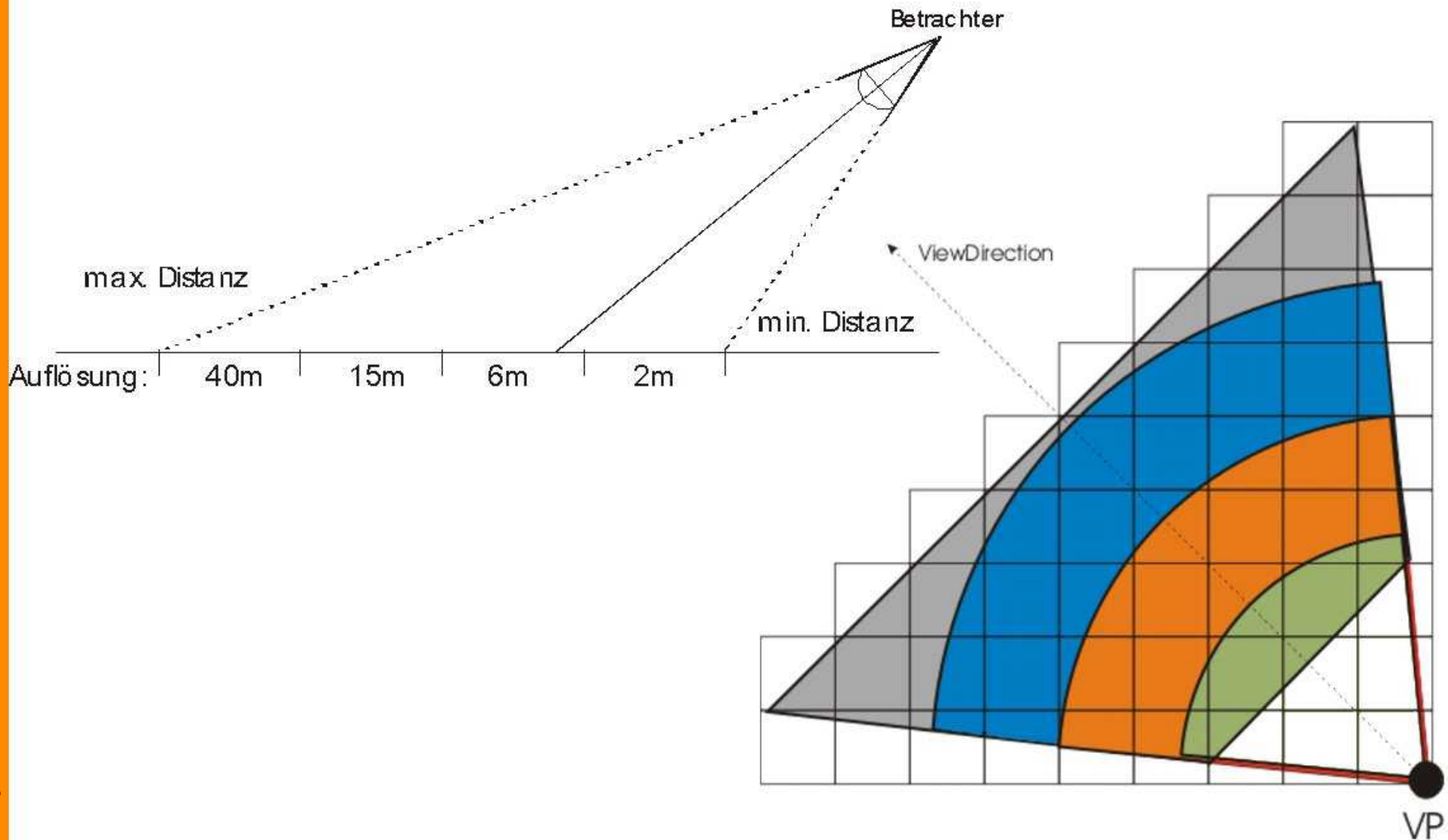


Web Terrain Service / Web Perspective View Service



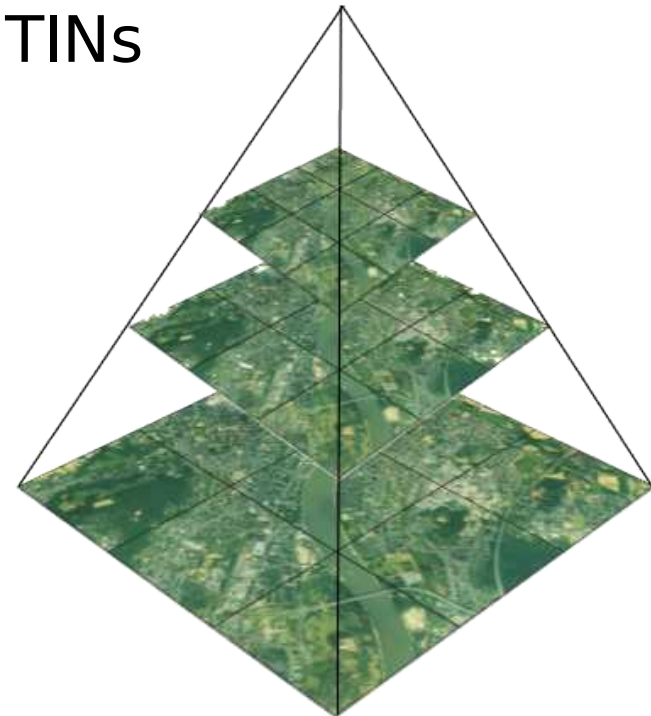
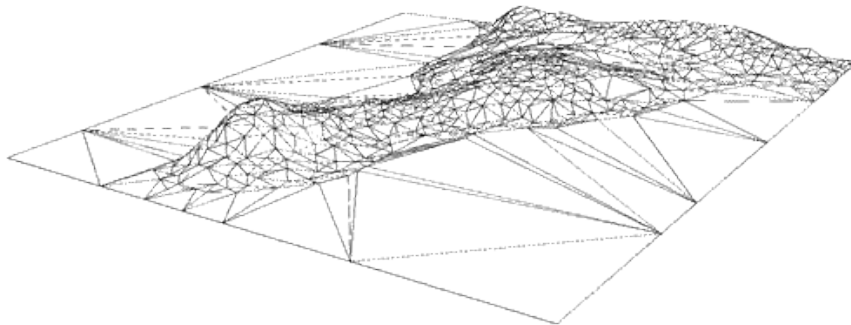
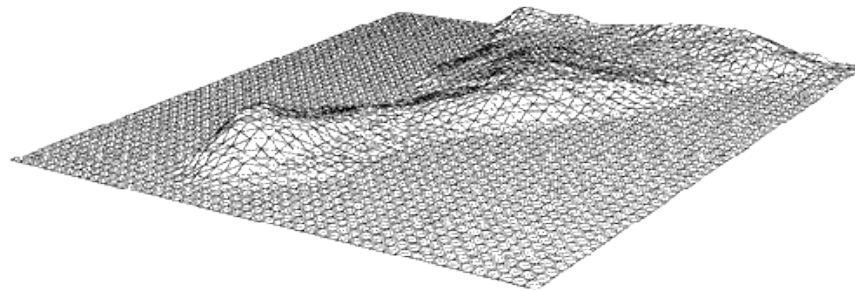
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&STYLES=default&DEM=DGMBonn&LAYERS=GebaeudeBonn](http://myServer/deegree/wts?VERSION=0.5&REQUEST=GetView&SRS=EPSG:31466&POI=2578563,5622017,150&YAW=45&PITCH=30&DISTANCE=2000&AOV=45&TERRAIN=LuftbildBonn&STYLES=default&DEM=DGMBonn&LAYERS=GebaeudeBonn)

Data Organization for Visualizations by WTS/WPVS

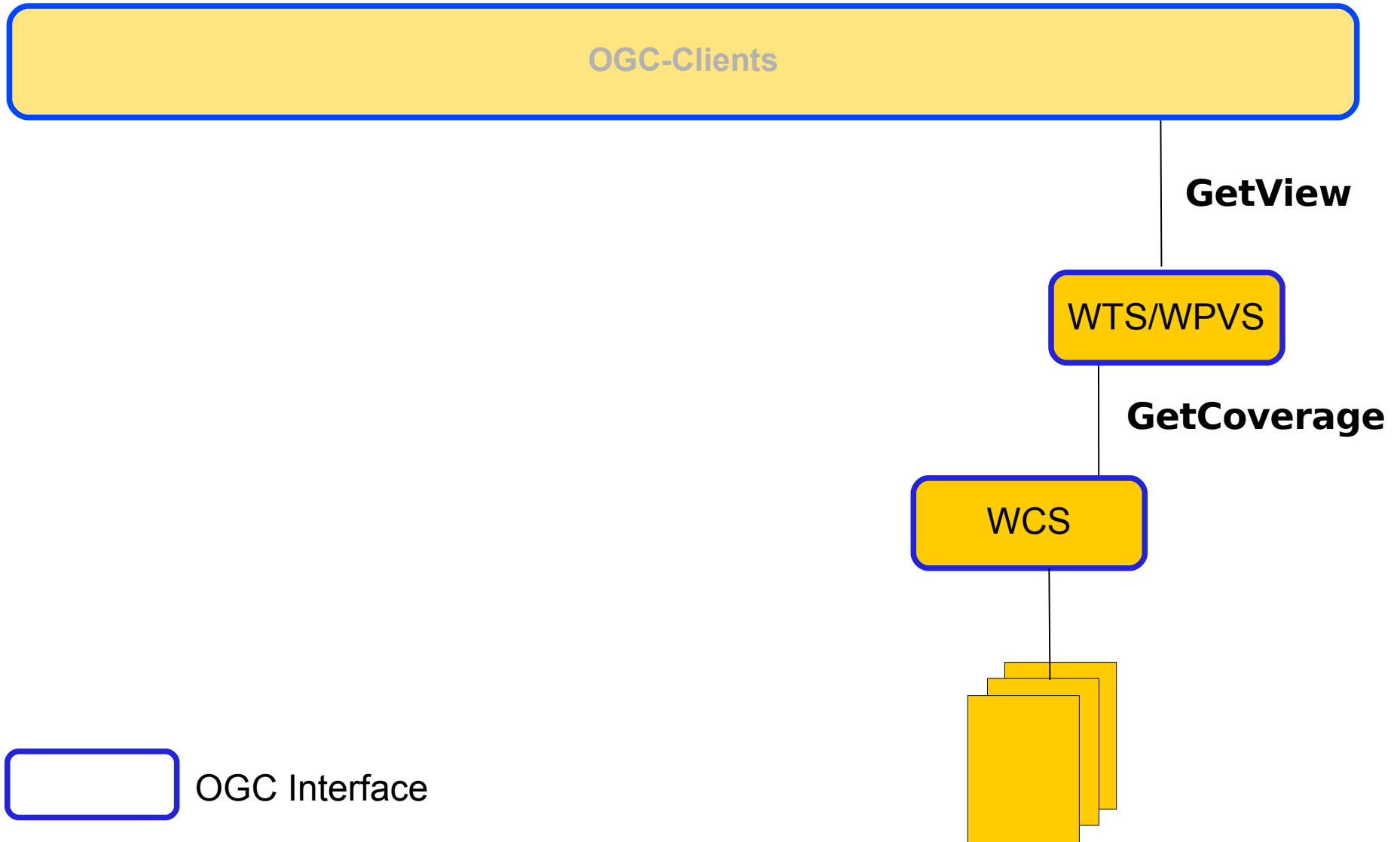


Digital Elevation Models

- Reducing amounts of data
 - pre-processing of tiles provided by Web Coverage Service
 - reducing data by generating TINs



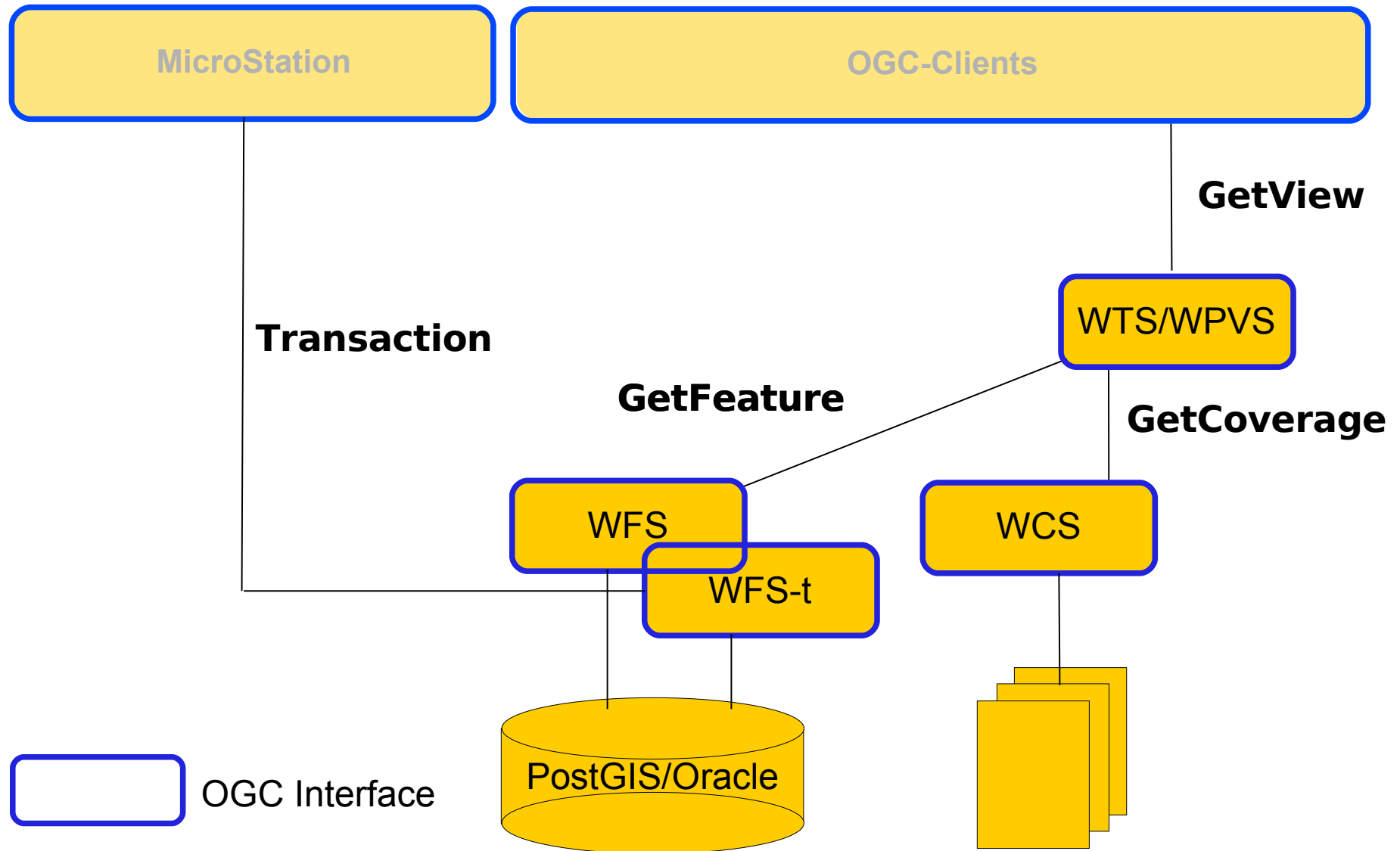
WCS in Architecture



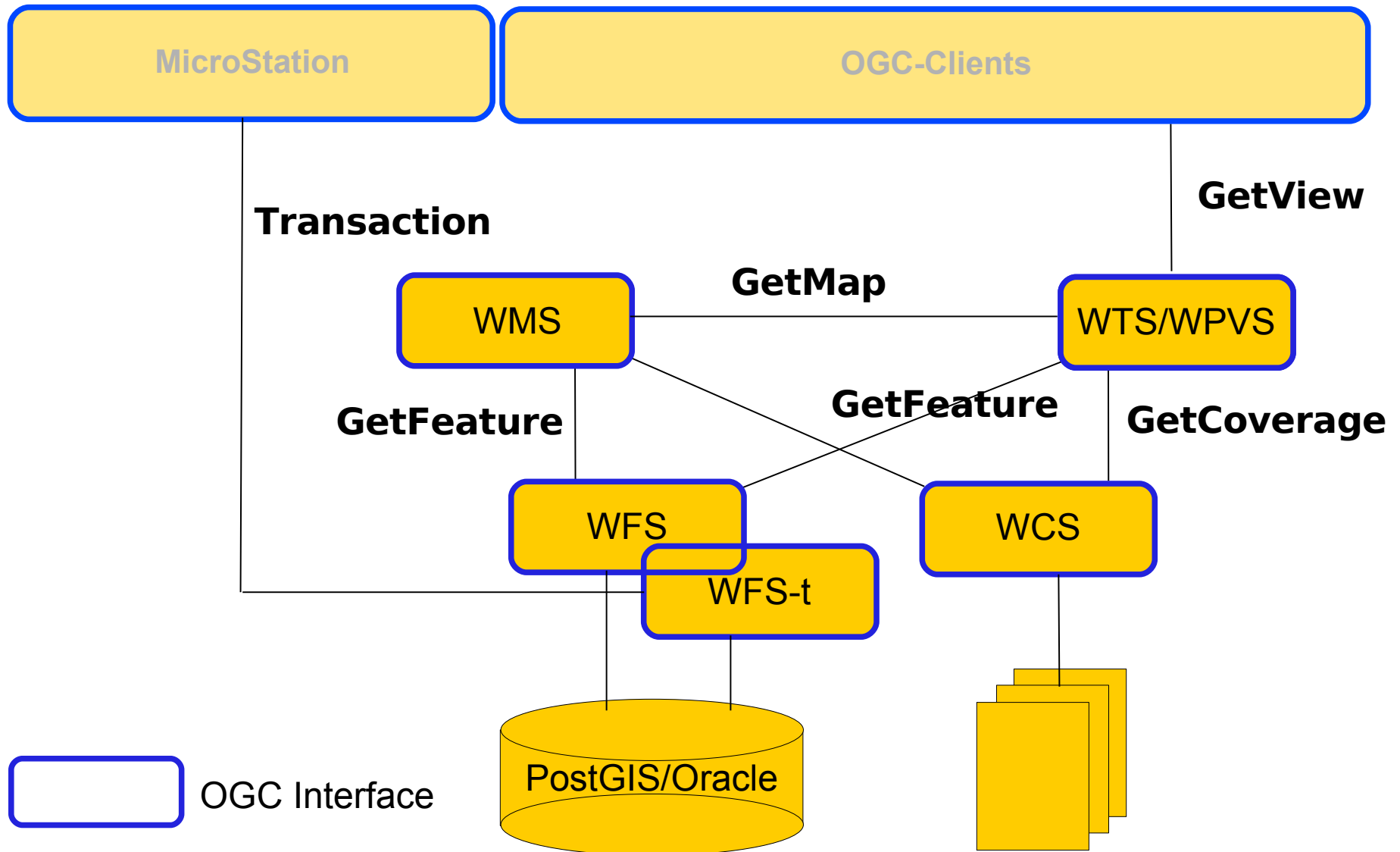
City Models/BIM via Web Feature S.

- Supporting of CityGML Application Schema (initiated though SDI NRW; now in OGC process)
- Export and Import of CityGML Objects via WFS 1.1
- Export as KML possible
- Transactional WFS based on database backends like PostGIS or Oracle

WFS in Architecture



Entire Architecture



Browser based WTS-Client

- „Thin Client“: without Plug-Ins
- Map-based Navigation in 3D-Scenes
- Simple Integration via a „3D-Button“ in existing clients



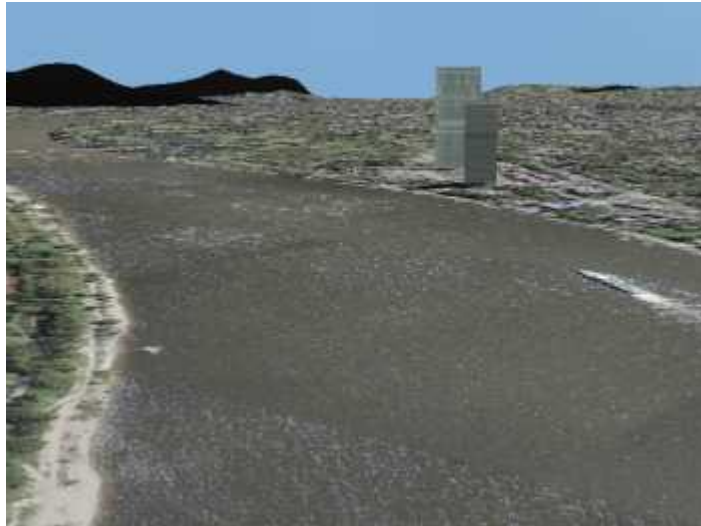
deegree iGeo3D in use

- Berlin: Developing a CityGML based database for City of Berlin
- Surveying and Mapping Agency NRW, Bonn and Berlin: Access to 3D-Data via OGC-Web Services
- Setup of a CityGML-WFS for OGC Web Services Phase 4 Initiative
- Hamburg: Editing and Datastorage Component for 3D City Models
- Germany Wide: Setup of a WPVS for the Bundesamt für Kartographie und Geodäsie

Some more samples: varying time



Some more Samples: Change view conditions



Software & Standards used

- deegree WFS-t – OGC WFS 1.1
- deegree WTS – OGC WPVS 0.x (Internal Paper)
- deegree WCS – OGC WCS 1.0
- deegree WMS – OGC WMS 1.1.1/1.3.0
- deegree WTS/WPVS Client
- PostGIS or Oracle Spatial

Hamburg @ Google Earth?

Conclusion & Outlook

- deegree iGeo3D is a standard-based Open Source Solution for Storing and Visualizing 3D spatial data
- CityGML as a standard-based exchange format plays a central role in deegree iGeo3D

Questions & Comments?!

- Lab: L-16: deegree iGeosecurity - Access Control for OGC Web Services (Today, 10.30 Colwood)



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