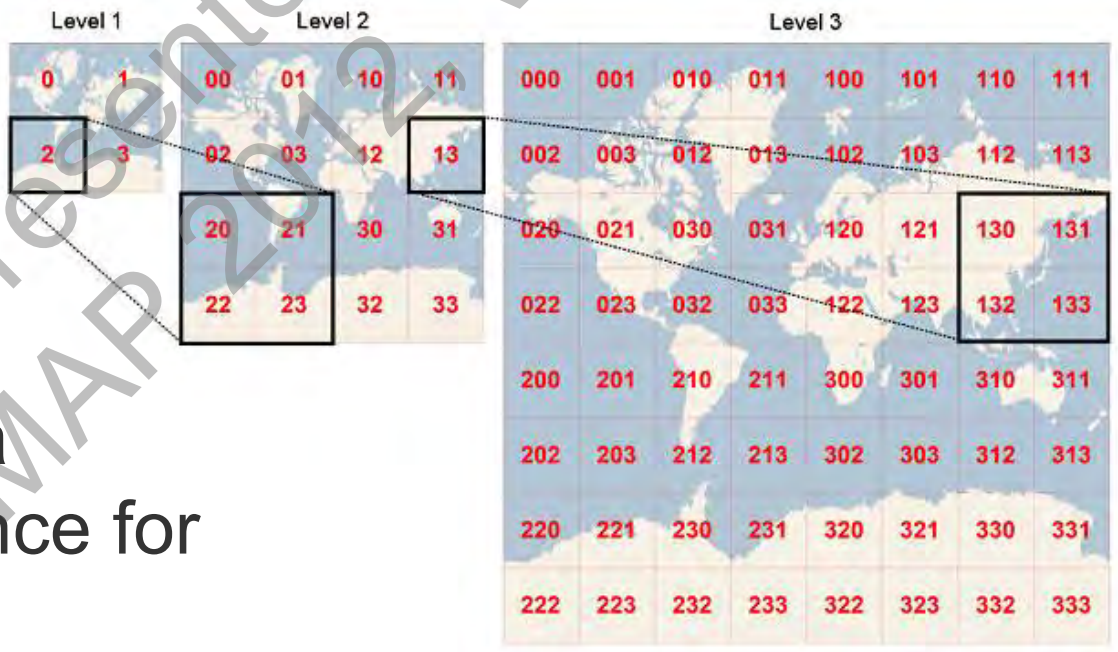
basemap.at – Creating a Harmonised Web Base Map for Austria

Manuela Schmidt, Vienna University of Technology
Wolfgang Jörg, Municipality of Vienna

Base maps in web mapping…

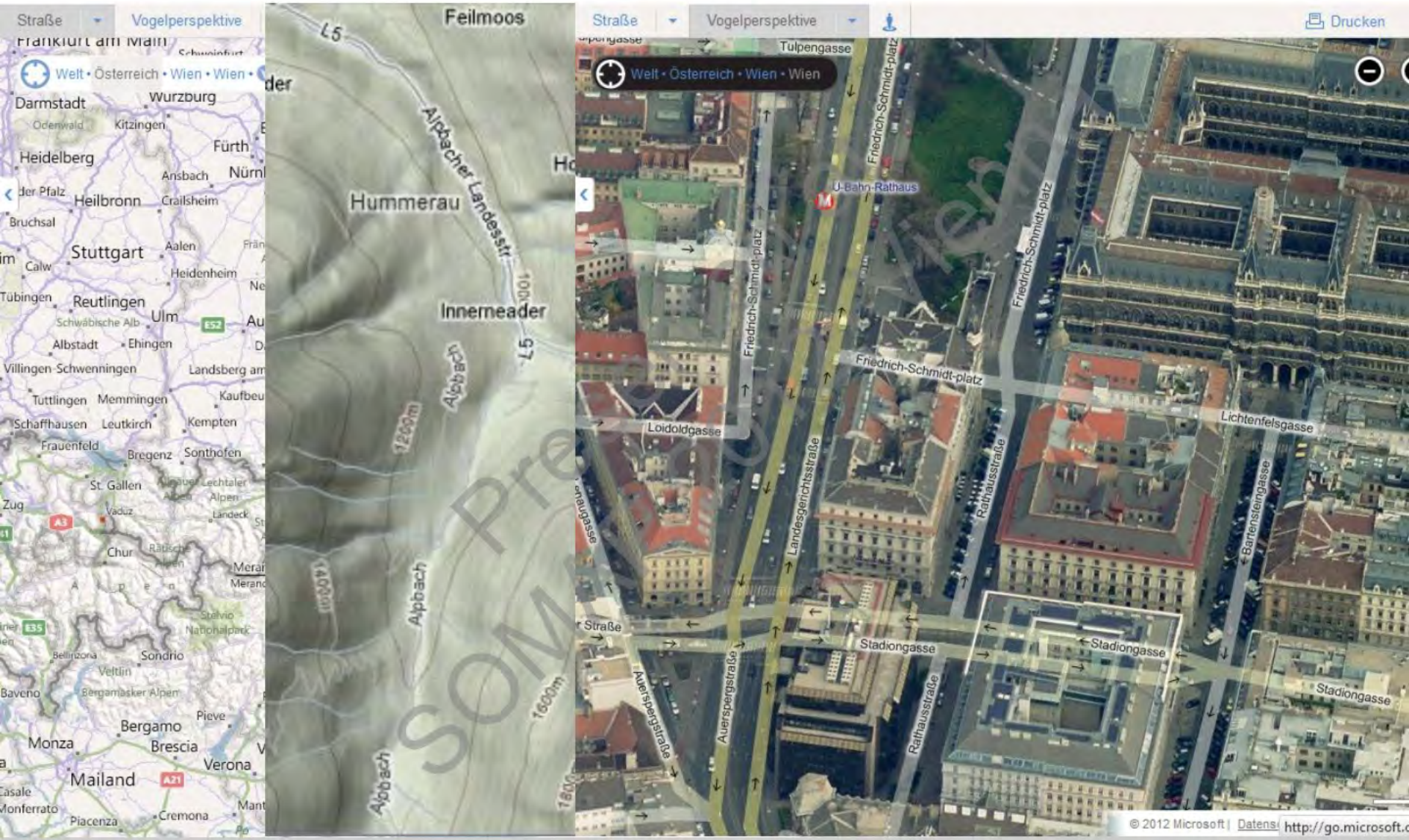
- maps, delivered as raster tiles
- in a defined set of scales
- often published as a web service



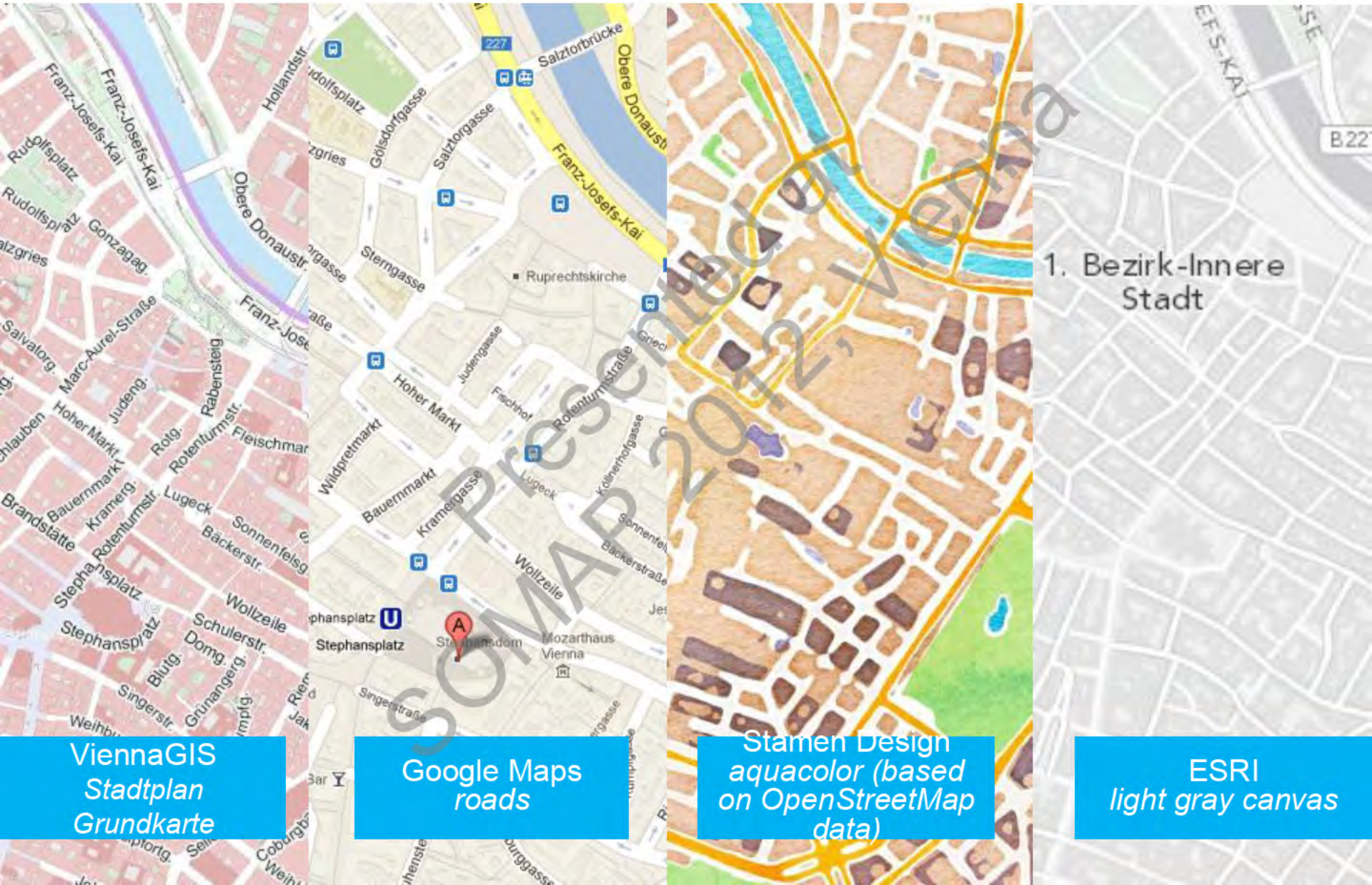
Source: Microsoft Virtual Earth SDK

- can be used as a locational reference for overlaying data

Broad range of map types



Broad range of map styles



Broad range of base maps

- **map types**
- **map styles**
- **data sources**: commercial data, crowdsourced data, administrational data
- **license models**:
  - free + open (attribution, share alike)
  - free + (often unclear) commercial terms of use: e.g. advertisements on maps
  - pricing based on map visits or data volume

Some problems with base maps

- **data**
  - missing metadata
  - varying data density/quality
- **hosting**
  - depending on the provider: slow/unreliable, hosting on own servers not allowed, only own hosting allowed
- **licenses**
  - unclear licenses, no contact person
  - sudden license changes

Aims of basemap.at

Offering a…

harmonised web base map of the
whole state of Austria

up-to-date

primarily based on
administrational data

implemented as WMTS in
Web Mercator Auxiliary Sphere
(EPSG:3857)

under a **free license** (CC-BY 3.0 AT)

Collaborative partners

geoland.at

Das Geodatenportal der österreichischen Länder

- Federal provinces of Austria (geoland.at)
- Transport Network [ITS Vienna Region Verkehrsverbund Ost-Region (VOR)]
- SynerGIS
- Vienna University of Technology

bMAP basemap.at

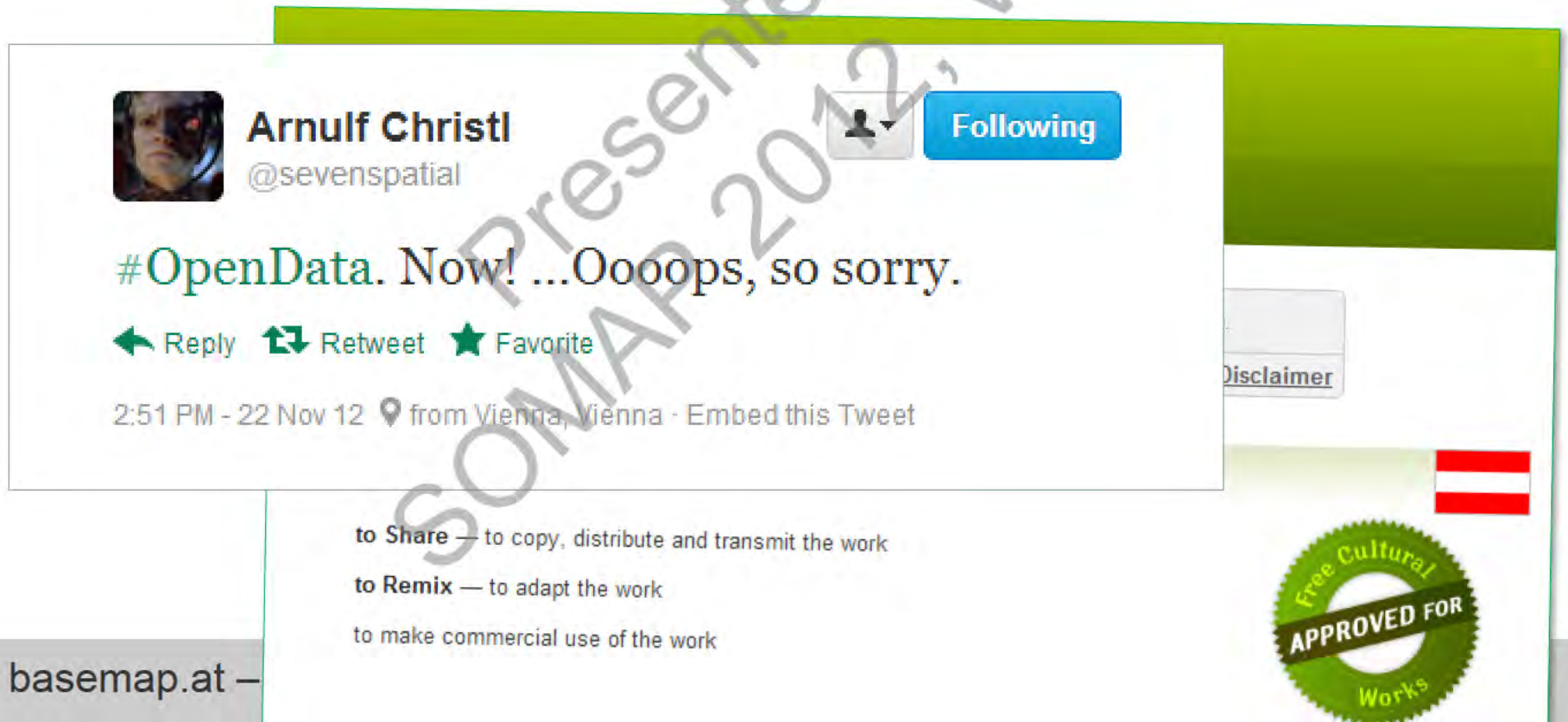
Data sources

- the project uses the data, which are created by the Austrian province governments
  - **aim:** creating a common and harmonized view of the decentrally organized data

- main source for traffic data:
  GIP.at: joint, nationwide multimodal graph of Austria's transport network

License

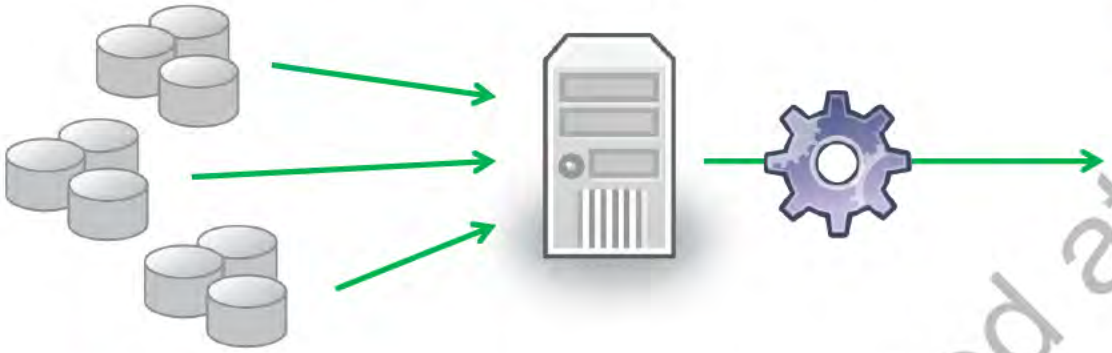
- tile cache is published under CC-BY 3.0 AT
- original data is only used to produce the tile cache

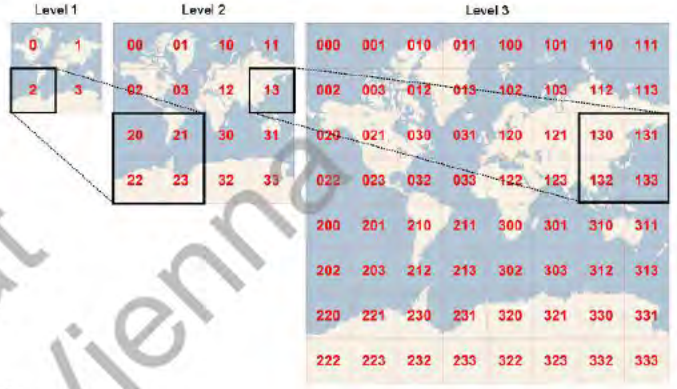


Up-to-dateness

- basemap.at should be as up-to-date as the data it is based on
  - to ensure fast updates: incremental updates – just tiles with changes are newly rendered

Technical framework





- workflow is based on ESRI technology
- challenges:
  - standardized data delivery
  - incremental updates of the tile cache
  - fail-safe hardware and WMTS
    - adequate hardware dimensions
    - monitoring components
    - technical maintenance staff

Cartographic implementation

Exploring the zoom levels

zoom levels	approx. scale
20	564
19	1.128
18	2.257
17	4.514
16	9.028
15	18.056
14	36.112
13	72.224
12	144.448
11	288.895
10	577.791
9	1.155.581
8	2.311.162
7	4.622.324
6	9.244.649
5	18.489.298
4	36.978.595
3	73.957.191
2	147.914.382
1	295.828.764
0	591.657.528

Choosing the relevant zoom levels

Defining data layers

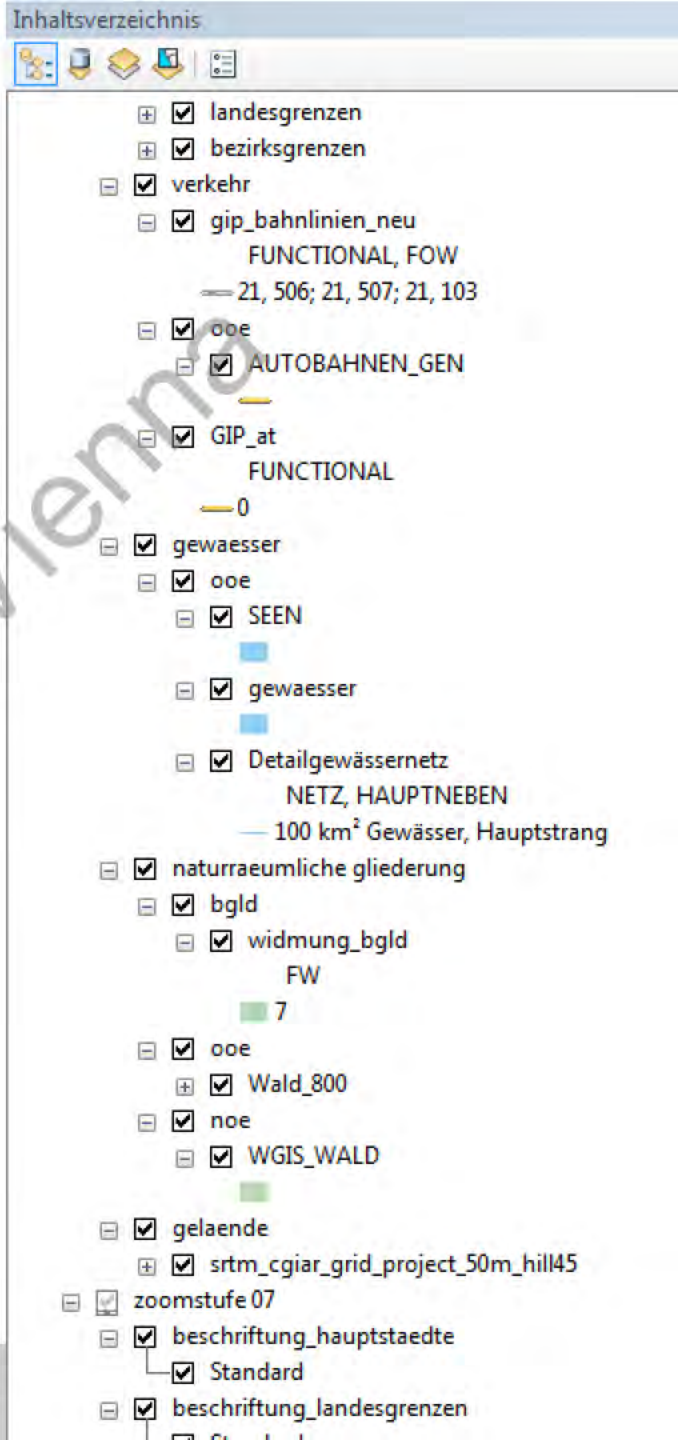
- which layers should be included?
- which layers should be included on which zoom level?
- which layers should be labelled on which zoom level?

	7	8	9	10	11	12	13	14	15	16	17	18	19
	3.092.945	1.546.472	773.236	386.618	193.309	96.655	48 327	24.164	12.082	6.041	3.020	1.510	755
Gewässernetz	Seen	x	x	x	x	x	x	x	x	x	x	x	x
Verkehrswege													
Autobahn	x	x	x	x	x	x	x	x	x	x	x	x	x
1. Ordnung	x	x	x	x	x	x	x	x	x	x	x	x	x
2. Ordnung		x	x	x	x	x	x	x	x	x	x	x	x
3. Ordnung			x	x	x	x	x	x	x	x	x	x	x
Ortsstraßen				x	x	x	x	x	x	x	x	x	x
Schienennetz						x	x	x	x	x	x	x	x
Öffi-Signaturen							x	x	x	x	x	x	x
administrative Grenzen	x	x	x	x	Bezirke	x	x	x	x	x	x	x	x
Siedlungen	Signatur				x	x	x	x	x	x	x	x	x
Bodenbedeckung		x	x	x	x	x	x	x	x	x	x	x	x
POIs						x	x	x	x	x	x	x	x
Höhenlinien													
Schummerung	x	x	x	x	x	x	x	x	x	x	x	x	x

Beschriftung

Symbolisation

- Symbolisation defined in ArcMap 10.0
  - based on datasets of 4 provinces (OÖ, NÖ, Bgld, Wien)
- working with many layers



Cartographic Symbolisation

- organizing the style definitions in ScaleMasters
  - *ScaleMaster is a structured diagram for organizing multi-scale mapping using multiple databases and design, selection, and generalization decisions* (Cindy Brewer)

basemap.at – ScaleMaster

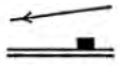
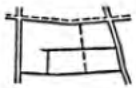
Version 1, 23. Juli 2012. Basierend auf Layerkonzept.

	1.128	2.257	4.514	9.028	18.056	36.112	72.224	144.448	288.895	577.791	1.155.581	2.311.162	4.622.324	AT	GIP W/ NÖ/ Bgld	NÖ	W	Bgld	OÖ	Stmk	T	Ktn	Sbg	Vbg	Stylename (siehe basemap.style)
Zoomlevel (L):	19	18	17	16	15	14	13	12	11	10	9	8	7												
Verwaltung																									
Grenzen																									
Bundesgrenzen												Gs		x											bundesgrenzen
Landesgrenzen												Gs		x											landesgrenzen
Bezirksgrenzen								Sa		Sa				x											bezirksgrenzen
Gemeindegrenzen														x											gemeindegrenzen
b: Bundesgrenzen														x											*grenzbeschriftung*
b: Landesgrenzen														x											*bundeslandbeschriftung, grenzbeschriftu*
b: Bezirksgrenzen														x											*grenzbeschriftung*
b: Gemeindegrenzen														x											*grenzbeschriftung*
Gipfel						Sa, Cc				Cc		Cc		x		x		x	x						gipfel_8-14, gipfel_15-19

Cartographic challenges

- **harmonising** data sets from different sources
- **generalisation**
  - data, created and optimised for a certain scale need to be used in scales from 1:400 to 1:3,000,000
  - only generalisation methods,
    - which can be automated also for incremental updates
    - which affects layers, which don't change much

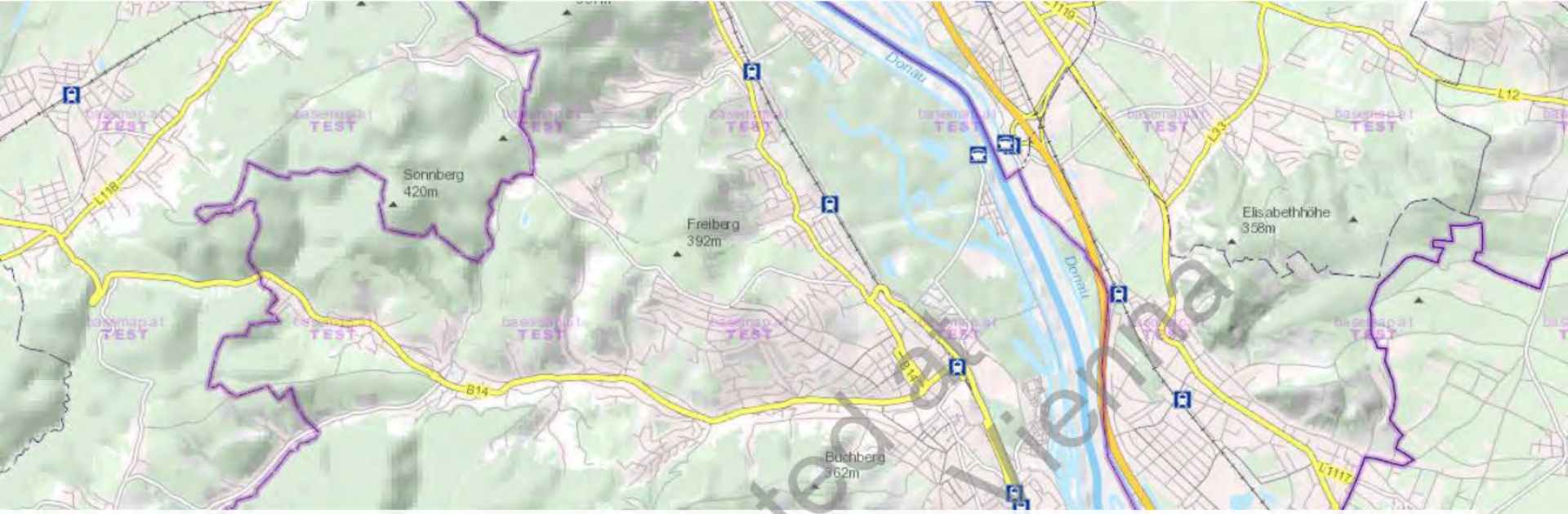
Elementare Vorgänge der kartografischen Generalisierung

Elementarer Vorgang	Darstellung in der Ausgangskarte	Darstellung in der neuen Karte (Maßstab der Ausgangskarte)	Darstellung in der neuen Karte (Maßstab der neuen Karte)
Rein geometrische Generalisierung			
1 Vereinfachen			
2 Vergrößern (vor allem Verbreitern)			
3 Verdrängen (Folge von 2)			
Geometrisch-begriffliche Generalisierung			
4 Zusammenfassen			
5 Auswählen (bzw. Fortlassen)			
6 Klassifizieren bzw. Typisieren (einschließlich Umwandeln in Signaturen)	 	 	
7 Bewerten (z. B. Betonen)			

Quelle: Günter Hake: Kartographie I, 5. Auflage, de Gruyter, Berlin 1975

Schedule

- prototype in fall 2012
  - test area with 4 provinces
  - cartographic symbolisation is not final yet
  - go to www.basemap.at
- final implem



Thank you for your attention!

- basemap.at is supported by the Climate and Endergy Fonds, Austria