Kapitel 4 (4b)

PostGIS Geometrie-Typen

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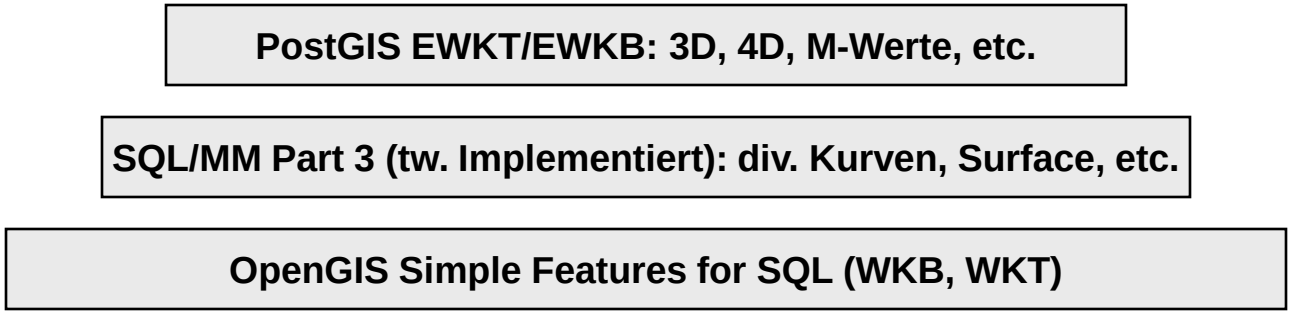
Dank an Dr. Andreas Neumann

Überblick

- PostGIS Geometrietypen
- PostGIS Administration
  - PostGIS System-Views
  - Räumlicher Index

PostGIS Geometrietypen



Legende:

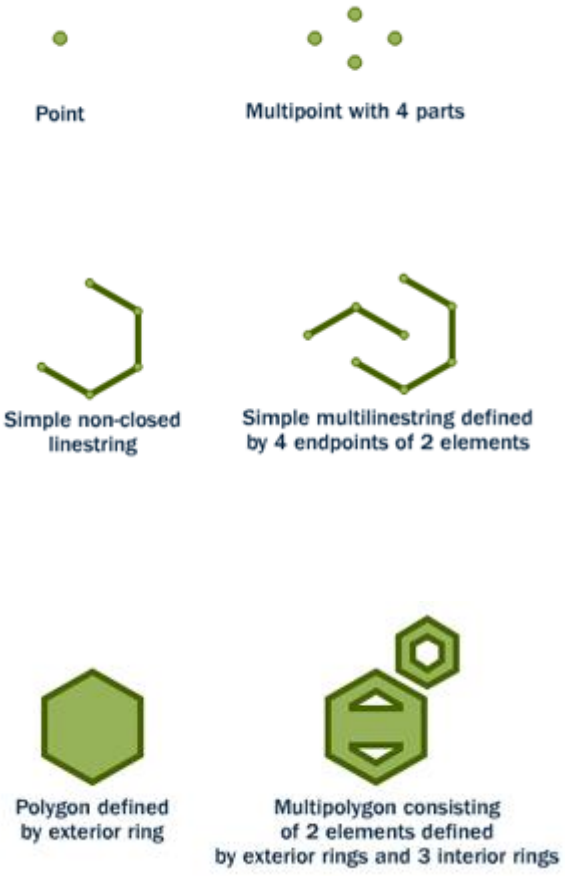
WKT: Well-Known Text (OGC)

WKB: Well-Known Binary (OGC)

EWKT/EWKB: Extended WKT und WKB (PostGIS-spezifisch); plus 3d + plus M-Werte

SQL-MM: SQL Multimedia Applications Spatial specification: Curve Extensions

Simple Features for SQL



Source: http://workshops.boundlessgeo.com/postgis-intro/geometries.html

Beispiele Simple Features for SQL

```
POINT(0 0)

LINESTRING(0 0,1 1,1 2)

POLYGON((0 0,4 0,4 4,0 4,0 0),(1 1, 2 1, 2 2, 1 2,1 1))

MULTIPOINT(0 0,1 2)

MULTILINESTRING((0 0,1 1,1 2),(2 3,3 2,5 4))

MULTIPOLYGON(((0 0,4 0,4 4,0 4,0 0),(1 1,2 1,2 2,1 2,1 1)),
((-1 -1,-1 -2,-2 -2,-2 -1,-1 -1)))

GEOMETRYCOLLECTION(POINT(2 3),LINESTRING((2 3,3 4)))
```

Beispiele PostGIS EWKT

```
POINT(0 0 0) -- XYZ

SRID=32632;POINT(0 0) -- XY with SRID

POINTM(0 0 0) -- XYM

POINT(0 0 0 0) -- XYZM

SRID=4326;MULTIPOINTM(0 0 0,1 2 1) -- XYM with SRID

MULTILINESTRING((0 0 0,1 1 0,1 2 1),(2 3 1,3 2 1,5 4 1))

POLYGON((0 0 0,4 0 0,4 4 0,0 4 0,0 0 0),(1 1 0,2 1 0,2 2 0,1
2 0,1 1 0))

MULTIPOLYGON(((0 0 0,4 0 0,4 4 0,0 4 0,0 0 0),(1 1 0,2 1 0,2
2 0,1 2 0,1 1 0)),((-1 -1 0,-1 -2 0,-2 -2 0,-2 -1 0,-1 -1
0)))

GEOMETRYCOLLECTIONM(POINTM(2 3 9), LINESTRINGM(2 3 4, 3 4 5))
```

SQL/MM Geometrien

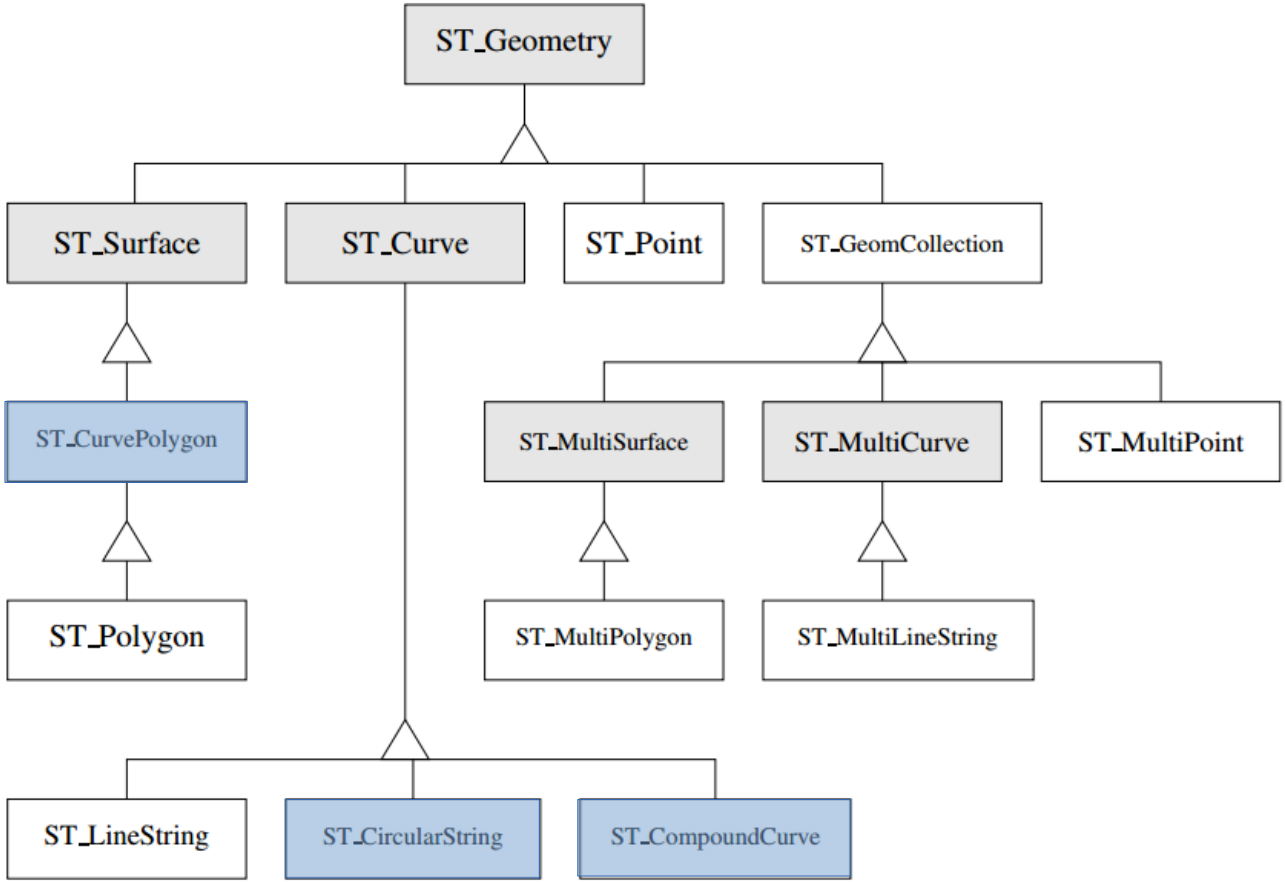
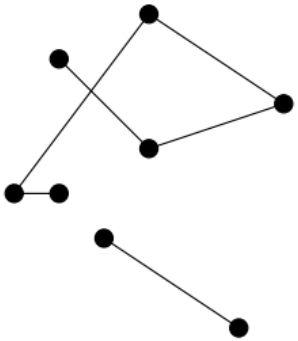


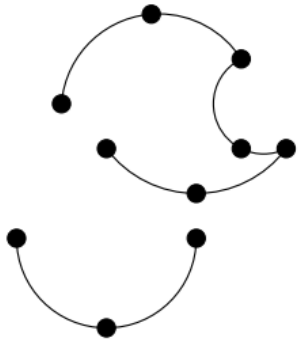
Figure 2: SQL Type Hierarchy

Source:
Knut Stolze (SQL-MM paper)

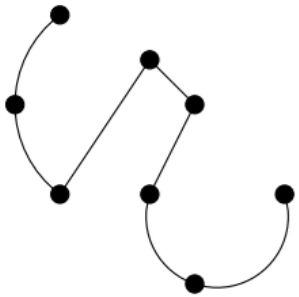
SQL/MM Geometrien



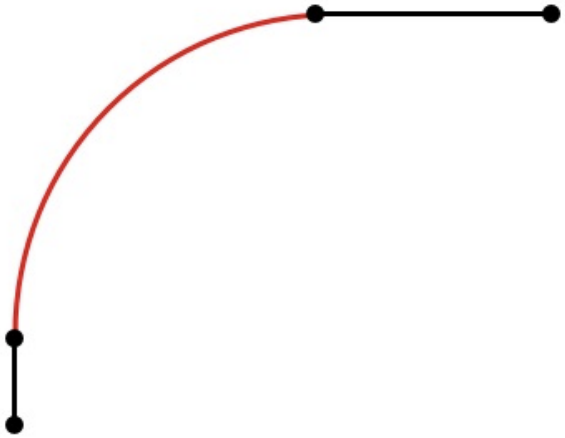
(a) Linear Strings

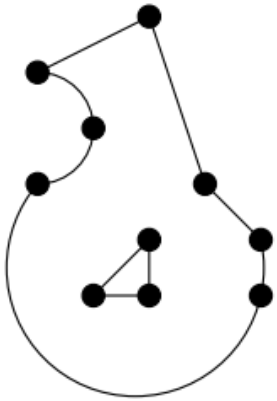


(b) Circular Strings

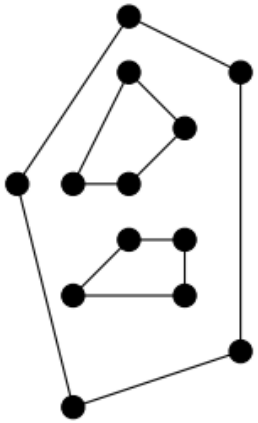


(c) Compounds





(a) Curve Polygon



(b) Polygon

Sources:
Knut Stolze (SQL-MM paper)
and BoundlessGeo

Beispiele SQL-MM Geometrien

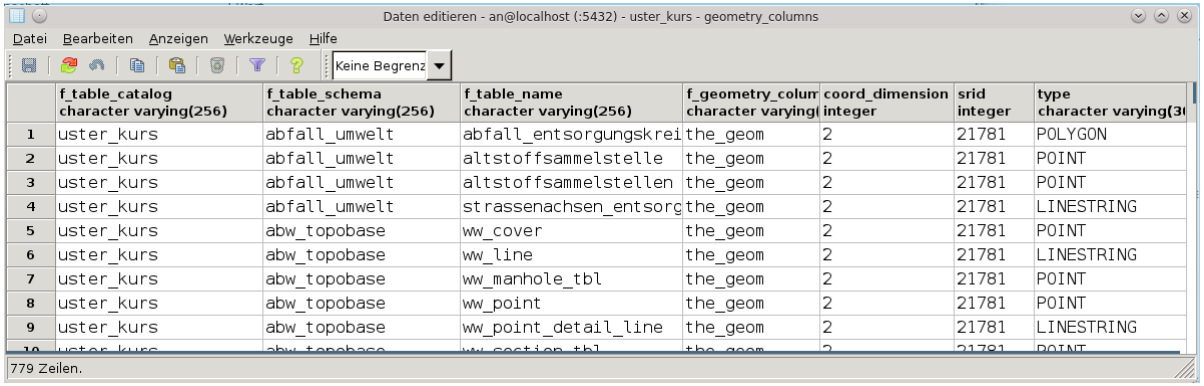
```
CIRCULARSTRING(0 0, 1 1, 1 0)

COMPOUNDCURVE(CIRCULARSTRING(0 0, 1 1, 1 0),(1 0, 0 1))

CURVEPOLYGON(CIRCULARSTRING(0 0, 4 0, 4 4, 0 4, 0 0),(1 1, 3
3, 3 1, 1 1))

MULTICURVE((0 0, 5 5),CIRCULARSTRING(4 0, 4 4, 8 4))

MULTISURFACE(CURVEPOLYGON(CIRCULARSTRING(0 0, 4 0, 4 4, 0 4,
0 0),(1 1, 3 3, 3 1, 1 1)),((10 10, 14 12, 11 10, 10 10),(11
11, 11.5 11, 11 11.5, 11 11)))

GEOMETRYCOLLECTIONM(POINTM(2 3 9), LINESTRINGM(2 3 4, 3 4 5))
```

PostGIS Systemtabellen

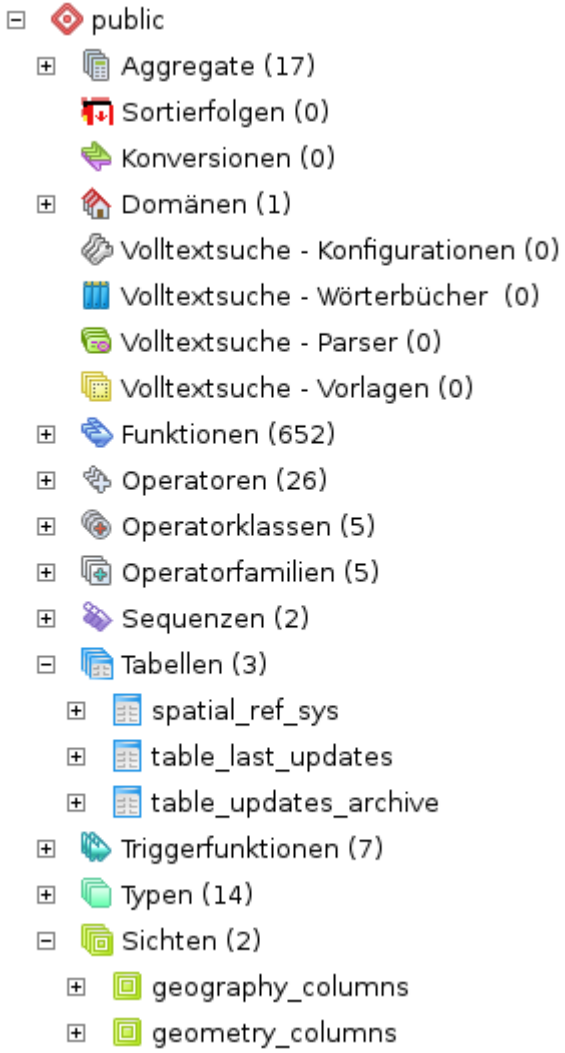
◆**public.geometry_columns**
- View aller Tabellen mit Geometry-Spalten
- mehrere Geometrie-Spalten pro Tabelle zulässig
  > Mehrfacheinträge in public.geometry_columns

◆**public.geography_columns**
- View aller Tabellen mit Geography-Spalten
- mehrere Geography-Spalten pro Tabelle zulässig
  > Mehrfacheinträge in public.geography_columns

◆**public.spatial_ref_sys**
- Tabelle mit allen Definitionen der Koordinatensysteme mit SRID, Beschrieb und proj4-Parametern



	f_table_catalog character varying(256)	f_table_schema character varying(256)	f_table_name character varying(256)	f_geometry_colum character varying(	coord_dimension integer	srid integer	type character varying(3
1	uster_kurs	abfall_umwelt	abfall_entsorgungskrei	the_geom	2	21781	POLYGON
2	uster_kurs	abfall_umwelt	altstoffsammelstelle	the_geom	2	21781	POINT
3	uster_kurs	abfall_umwelt	altstoffsammelstellen	the_geom	2	21781	POINT
4	uster_kurs	abfall_umwelt	strassenachsen_entsorg	the_geom	2	21781	LINESTRING
5	uster_kurs	abw_topobase	ww_cover	the_geom	2	21781	POINT
6	uster_kurs	abw_topobase	ww_line	the_geom	2	21781	LINESTRING
7	uster_kurs	abw_topobase	ww_manhole_tbl	the_geom	2	21781	POINT
8	uster_kurs	abw_topobase	ww_point	the_geom	2	21781	POINT
9	uster_kurs	abw_topobase	ww_point_detail_line	the_geom	2	21781	LINESTRING
10	uster_kurs	abw_topobase	ww_section_tbl	the_geom	2	21781	POINT



Räumlicher Index

- Beschleunigung von räumlichen Abfragen
- Basierend auf Bounding-Boxen und rtree

Beispiel:

```
CREATE INDEX in_av_parzellen_geom
  ON av.parzellen USING GIST (geom);
```