

**ORACLE®**

**Geodaten und die Oracle-Technologie  
Oracle Locator, Spatial und Oracle MAPS**

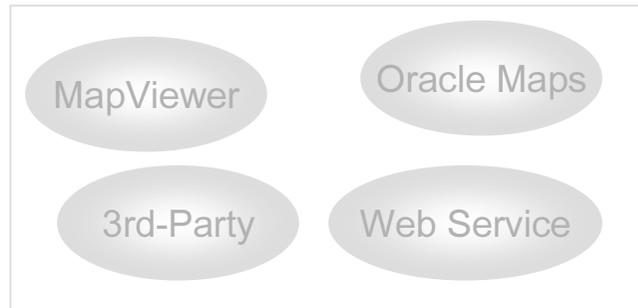
# Das Fundament: Die Oracle-Datenbank

## Offene Geodaten – offene Plattform!



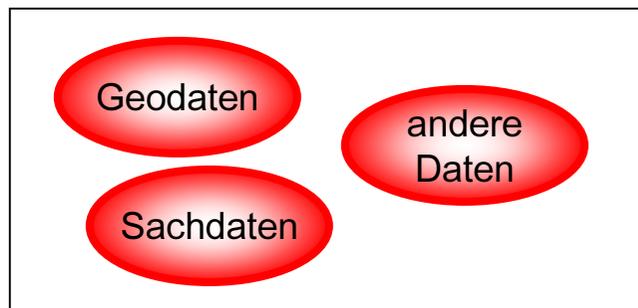
Oracle Application Server

Konkrete Lösungsapplikation  
Fachliche Lösungen



Oracle Application Server

Kartendarstellung  
WMS Dienste  
Routenberechnung



Oracle Database

Geodaten / Räumliche Abfragen  
Räumliche Indizes  
Verschneidungen  
Daten-Manipulationen

# Oracle Spatial

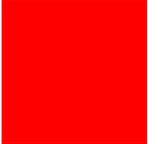
## Objektrelationale Implementierung

- Datentyp SDO\_GEOMETRY

Tabelle Gemeinde

ID	NAME	GRENZE
NUMBER	VARCHAR2	SDO_GEOMETRY

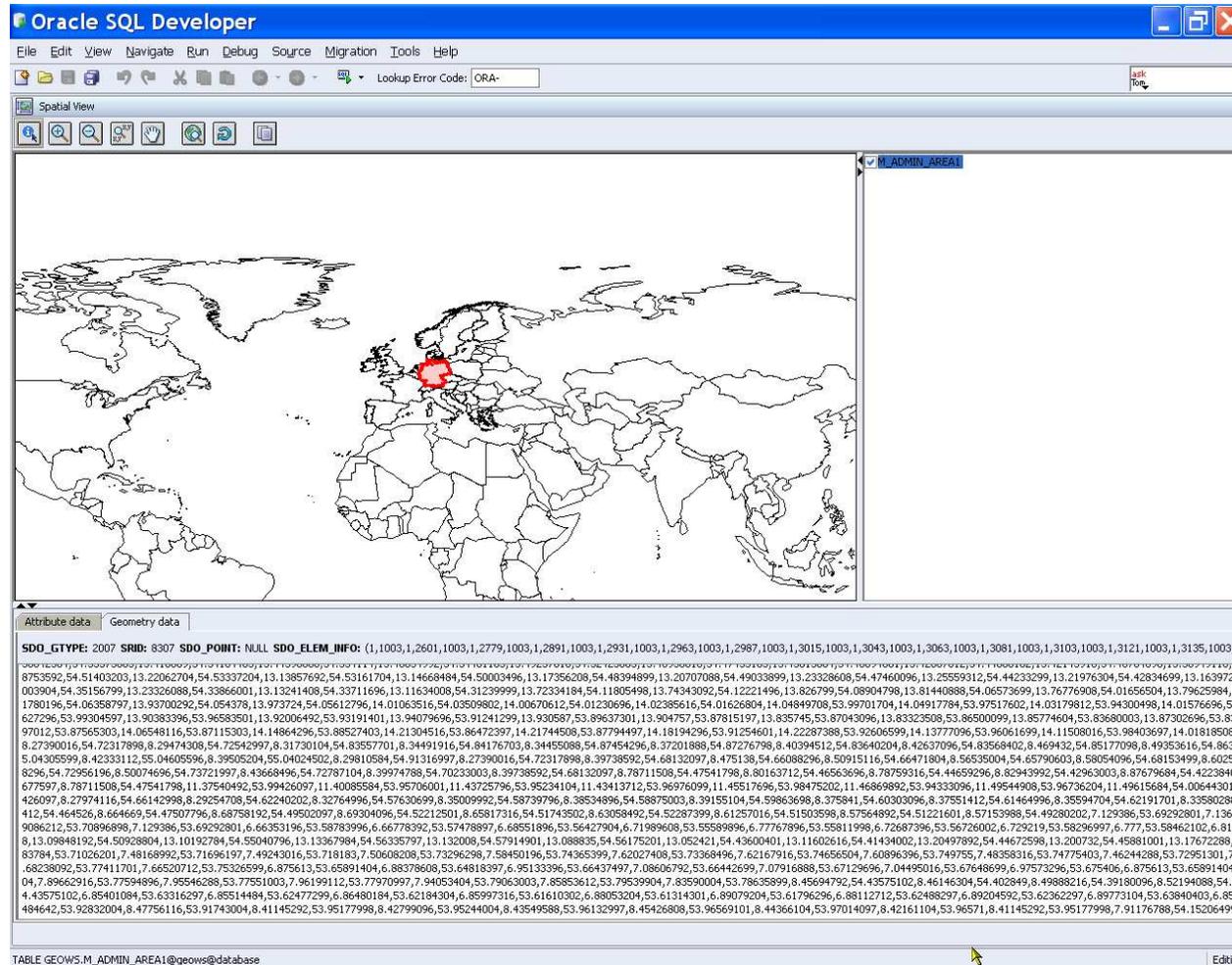
SDO_GTYPE	NUMBER
SDO_SRID	NUMBER
SDO_POINT	SDO_POINT_TYPE
SDO_ELEM_INFO	SDO_ELEM_INFO_ARRAY
SDO_ORDINATES	SDO_ORDINATE_ARRAY



# Datentyp SDO\_GEOMETRY

- Nativer Datentyp für Geodaten
  - Vektordaten: SDO\_GEOMETRY
  - Rasterdaten: SDO\_GEORASTER
- Verwendbar wie jeder andere Datentyp
  - Tabellendefinitionen
  - PL/SQL-Logik
  - Constraints (eingeschränkt) und Trigger

# Werkzeug: GeoRaptor für SQL Developer

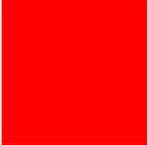


The screenshot shows the Oracle SQL Developer interface. At the top, there's a menu bar with options like File, Edit, View, Navigate, Run, Debug, Source, Migration, Tools, and Help. Below the menu is a toolbar with various icons. The main window is titled 'Spatial View' and displays a world map. A red location marker is placed in Europe. To the right of the map, there's a panel titled 'M\_ADMIN\_AREA1'. Below the map, there's a table with columns 'Attribute data' and 'Geometry data'. The table contains a long list of coordinates.

Attribute data	Geometry data
SDO_GTYPE: 2007 SRID: 8307 SDO_POINT: NULL SDO_ELEM_INFO: (1,1003,1,2601,1003,1,2779,1003,1,2891,1003,1,2931,1003,1,2963,1003,1,2987,1003,1,3015,1003,1,3043,1003,1,3063,1003,1,3081,1003,1,3103,1003,1,3121,1003,1,3135,1003,1,;	8753592,54,51403203,13.22062704,54,53337204,13.13857692,54,53161704,13.14668484,54,50000496,13.17356208,54,48394899,13.20707088,54,49032899,13.23328608,54,47460096,13.25559312,54,44233299,13.21976304,54,42834699,13.16397204,030094,54,35156799,13.23326088,54,33866001,13.13241408,54,33711696,13.11634008,54,31239999,13.72334184,54,11805498,13.74343092,54,12221496,13.826799,54,08904798,13.81408888,54,06573699,13.76276908,54,01656504,13.79625984,54,1780196,54,06358797,13.93700292,54,054378,13.973724,54,05612796,14,01063516,54,03809802,14,00670612,54,01230696,14,02385616,54,01626804,14,04849708,53,99701704,14,04917784,53,97517602,14,03179812,53,94300498,14,01576696,53,9,627296,53,99304597,13,90383396,53,96583501,13,92006492,53,93191401,13,94079696,53,91241299,13,930587,53,89637301,13,904757,53,87815197,13,835745,53,87043096,13,83323508,53,86500099,13,85774604,53,83680003,13,87302696,53,8312,97012,53,87565303,14,06548116,53,87115303,14,14864296,53,88527403,14,21304516,53,86472397,14,21744508,53,87794497,14,18194296,53,91254601,14,22287388,53,92606599,14,13777096,53,96061699,14,11508016,53,98403697,14,01818508,5,8,27390016,54,72317898,8,29474308,54,72542997,8,31730104,54,83557701,8,34491916,54,84176703,8,34455088,54,87454296,8,37201888,54,87276798,8,40394512,54,83640204,8,42637096,54,83568402,8,469432,54,85177098,8,49353616,54,86384,5,04305599,8,42333112,55,04605596,8,39505204,55,04024502,8,29810584,54,91316997,8,27390016,54,72317898,8,39738592,54,68132097,8,475138,54,66088296,8,50915116,54,66471804,8,56535004,54,65790603,8,58054096,54,68153499,8,602544,8296,54,72956196,8,50074696,54,73721997,8,43668496,54,72787104,8,39974788,54,70233003,8,39738592,54,68132097,8,78711508,54,47541798,8,80163712,54,46563696,8,78759316,54,4659296,8,82943952,54,42963003,8,87673684,54,42238404,677597,8,78711508,54,47541798,11,37540492,53,99426097,11,40085584,53,95706001,11,43725796,53,95234104,11,43413712,53,96976099,11,45517696,53,98475202,11,46869892,53,94333096,11,49544908,53,96736204,11,49615684,54,00644301,11,426097,8,27974116,54,66142998,8,29254708,54,62240202,8,32764996,54,57630699,8,35009992,54,58739796,8,38534896,54,58875003,8,39155104,54,59863698,8,375841,54,60303096,8,37551412,54,61464996,8,35594704,54,62191701,8,33580288,5,412,54,464526,8,664669,54,47507796,8,66758192,54,49502097,8,69304096,54,52212501,8,65817316,54,51743502,8,63058492,54,52287399,8,61257016,54,51503598,8,57564892,54,51221601,8,57153988,54,49280202,7,129386,53,69292801,7,136738,9086212,53,70896898,7,129386,53,69292801,6,66353196,53,58783996,6,66778392,53,57478897,6,68551896,53,56427904,6,71989608,53,55589896,6,77767896,53,55811998,6,72687396,53,56726002,6,7292159,53,58296997,6,777,53,58462102,6,81746,8,13,09848192,54,50928804,13,10192784,54,55040796,13,13367984,54,56335797,13,132008,54,57914901,13,088835,54,56175201,13,052421,54,43600001,13,11602616,54,41434002,13,20497892,54,44672598,13,200732,54,45881001,13,17672288,54,83784,53,71026201,7,48168992,53,71696197,7,49243016,53,718183,7,50608208,53,73296298,7,58400196,53,74653999,7,62027408,53,73368496,7,62167916,53,74656504,7,60896396,53,749755,7,48358316,53,74775403,7,46242288,53,72951301,7,66,68238092,53,77411701,7,66520712,53,75326299,6,8756153,53,65891404,6,88378608,53,64818397,6,96133956,53,66474797,7,08607952,53,66442699,7,07916888,53,67129696,7,04495016,53,67648699,6,97873296,53,675906,6,8796135,53,65891404,7,04,7,89662916,53,77594896,7,95546288,53,77551003,7,96191112,53,77970997,7,94053404,53,7963003,7,88363612,53,79539904,7,83590004,53,78638899,8,46594792,54,43575102,8,46146304,54,402849,8,4988216,54,3918096,8,52194088,54,398,4,43575102,6,85401084,53,63316297,6,8551484,53,62477299,6,86480184,53,62184304,6,85997316,53,61610302,6,89053204,53,61314301,6,89079204,53,61796296,6,88112712,53,62488297,6,89204592,53,62362297,6,89773104,53,63894003,6,8540,484642,53,92832004,8,47756116,53,91743004,8,41145292,53,95177998,8,42799096,53,95244004,8,43549588,53,96132997,8,45426808,53,96569101,8,44366104,53,97014097,8,42161104,53,96571,8,41145292,53,95177998,7,91176788,54,15206499,7

<http://georaptor.sourceforge.net/>

ORACLE



# Datentyp SDO\_GEOMETRY

## Aufbau

```
SQL> describe sdo_geometry
```

Name	Typ
SDO_GTYPE	NUMBER
SDO_SRID	NUMBER
SDO_POINT	MDSYS.SDO_POINT_TYPE
SDO_ELEM_INFO	MDSYS.SDO_ELEM_INFO_ARRAY
SDO_ORDINATES	MDSYS.SDO_ORDINATE_ARRAY
MEMBER FUNCTION GET_GTYPE RETURNS NUMBER	
MEMBER FUNCTION GET_DIMS RETURNS NUMBER	
MEMBER FUNCTION GET_WKB RETURNS BLOB	
MEMBER FUNCTION GET_WKT RETURNS CLOB	
MEMBER FUNCTION ST_ISVALID RETURNS NUMBER	
:	



# Vektordaten "pur": OGC-Standards

## Well Known Text und Well Known Binary

- GET()-Methoden ...

```
select e.geoloc.get_wkt() from de_hiway
```

```
E.GEoloc.GET_WKT()
```

```
-----  
LINESTRING (9.18699984 47.77039998, 9.18969984  
47.76949998, 9.19640016 47.763, 9.19919988  
47.75840001, 9.20459988 47.75570001)
```

```
LINESTRING (9.24000012 47.73709998, 9.24130008  
47.73349998, 9.23979996 47.72729997)
```

# Geodaten-Tabellen erstellen

- SDO\_GEOMETRY wie jeder andere Datentyp nutzbar
- Empfehlung: Nur eine SDO\_GEOMETRY-Spalte

```
CREATE TABLE GEO_KONTINENTE (  
    "AREA_ID"          NUMBER,  
    "AREA_NAME"        VARCHAR2(20 BYTE) ,  
    "FEATURE_TYPE"     CHAR(9 BYTE) ,  
    "GEOMETRY"         SDO_GEOMETRY  
)
```

# Spatial-Metadaten SQL Developer

Table: **M\_ADMIN\_AREA0** Geometry column: **GEOMETRY**

SRID:  8307  NULL

	Minimum	Maximum	Tolerance	
<input checked="" type="checkbox"/> X	-180	180	1	Calculate MBR
<input checked="" type="checkbox"/> Y	-90	90	1	
<input type="checkbox"/> Z				
<input type="checkbox"/> M				

Current Dimensions:

Table	Geometry column	SRID	Dimension Info
CUSTOMERS	GEOMETRY	8307	(('X', -180, 180, 1),('Y', -90, 90, 1))
M_ADMIN_AREA0	GEOMETRY	8307	(('X', -180, 180, 1),('Y', -90, 90, 1))
M_ADMIN_AREA1	GEOMETRY	8307	(('X', -180, 180, 1),('Y', -90, 90, 1))
M_ADMIN_AREA2	GEOMETRY	8307	(('X', -180, 180, 1),('Y', -90, 90, 1))
M_ADMIN_AREA3	GEOMETRY	8307	(('X', -180, 180, 1),('Y', -90, 90, 1))

Update Cancel

# Tabelle am Beispiel: GEO\_STAATEN

- Tabellenaufbau

```
SQL> desc geo_staaten
```

Name	Null?	Typ
-----	-----	-----
FEATURE_ID		NUMBER
FEATURE_NAME		VARCHAR2 (30)
AREA_ID		NUMBER
CAPITAL		VARCHAR2 (30)
FEATURE_TYPE		CHAR (7)
GEOMETRY		MDSYS.SDO_GEOMETRY

# Erste Schritte:

## Der Aufbau von SDO\_GEOMETRY

- Was sind die Koordinaten von Deutschland ...?

```
SQL> select id, x, y from
2     geo_staaten,
3     table(sdo_util.getvertices(geometry)) k
4     where feature_name='GERMANY' ;
```

ID	X	Y
1	14,720045	51,582406
2	14,7554651	51,603937
3	14,7570239	51,644129
:	:	:

# Erste Schritte:

## Der Aufbau von SDO\_GEOMETRY

- Welches Koordinatensystem wird verwendet ...?

```
SQL> select e.geometry.sdo_srid
       2   from geo_staaten e
       3   where feature_name='GERMANY' ;
```

```
GEOMETRY.SDO_SRID
```

```
-----
                        8307
```

```
SQL> select cs_name from cs_srs where srid=8307;
```

```
CS_NAME
```

```
-----
Longitude / Latitude (WGS 84)
```

# Und im SQL Developer

The screenshot displays the Oracle SQL Developer interface. The main window shows a map of Europe with a red polygon highlighting a region in Germany. The right-hand pane shows a tree view with the following items:

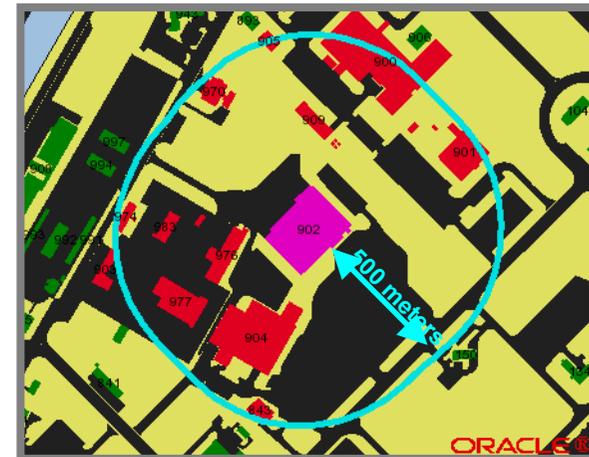
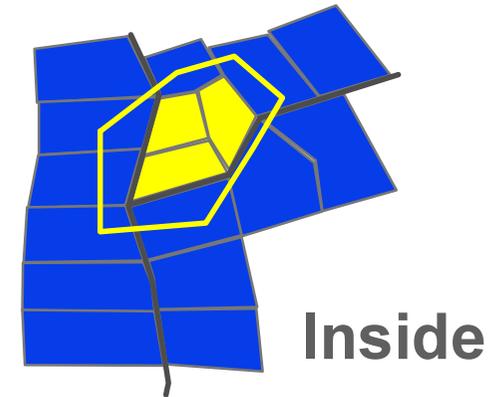
- M\_ADMIN\_AREA1
- M\_ADMIN\_AREA3
- M\_ADMIN\_AREA2
- M\_ADMIN\_AREA4

The bottom pane shows the 'Attribute data' window for the table 'SDO\_GEOM'. The data is as follows:

SDO_GTYPE	2007 SRID	6307 SDO_POINT	NULL SDO_ELEM_INFO
(1,1003,1,2601,1003,1,2779,1003,1,2891,1003,1,2931,1003,1,2963,1003,1,2987,1003,1,3015,1003,1,3043,1003,1,3063,1003,1,3081,1003,1,3103,1003,1,3121,1003,1,3135,1003,1,3157,1003,1,3179,1003,1,3201,1003,1,3223,1003,1,3245,1003,1,3267,1003,1,3289,1003,1,3311,1003,1,3333,1003,1,3355,1003,1,3377,1003,1,3401,1003,1,3425,1003,1,3449,1003,1,3473,1003,1,3497,1003,1,3521,1003,1,3545,1003,1,3569,1003,1,3593,1003,1,3617,1003,1,3641,1003,1,3665,1003,1,3689,1003,1,3713,1003,1,3737,1003,1,3761,1003,1,3785,1003,1,3809,1003,1,3833,1003,1,3857,1003,1,3881,1003,1,3905,1003,1,3929,1003,1,3953,1003,1,3977,1003,1,4001,1003,1,4025,1003,1,4049,1003,1,4073,1003,1,4097,1003,1,4121,1003,1,4145,1003,1,4169,1003,1,4193,1003,1,4217,1003,1,4241,1003,1,4265,1003,1,4289,1003,1,4313,1003,1,4337,1003,1,4361,1003,1,4385,1003,1,4409,1003,1,4433,1003,1,4457,1003,1,4481,1003,1,4505,1003,1,4529,1003,1,4553,1003,1,4577,1003,1,4601,1003,1,4625,1003,1,4649,1003,1,4673,1003,1,4697,1003,1,4721,1003,1,4745,1003,1,4769,1003,1,4793,1003,1,4817,1003,1,4841,1003,1,4865,1003,1,4889,1003,1,4913,1003,1,4937,1003,1,4961,1003,1,4985,1003,1,5009,1003,1,5033,1003,1,5057,1003,1,5081,1003,1,5105,1003,1,5129,1003,1,5153,1003,1,5177,1003,1,5201,1003,1,5225,1003,1,5249,1003,1,5273,1003,1,5297,1003,1,5321,1003,1,5345,1003,1,5369,1003,1,5393,1003,1,5417,1003,1,5441,1003,1,5465,1003,1,5489,1003,1,5513,1003,1,5537,1003,1,5561,1003,1,5585,1003,1,5609,1003,1,5633,1003,1,5657,1003,1,5681,1003,1,5705,1003,1,5729,1003,1,5753,1003,1,5777,1003,1,5801,1003,1,5825,1003,1,5849,1003,1,5873,1003,1,5897,1003,1,5921,1003,1,5945,1003,1,5969,1003,1,5993,1003,1,6017,1003,1,6041,1003,1,6065,1003,1,6089,1003,1,6113,1003,1,6137,1003,1,6161,1003,1,6185,1003,1,6209,1003,1,6233,1003,1,6257,1003,1,6281,1003,1,6305,1003,1,6329,1003,1,6353,1003,1,6377,1003,1,6401,1003,1,6425,1003,1,6449,1003,1,6473,1003,1,6497,1003,1,6521,1003,1,6545,1003,1,6569,1003,1,6593,1003,1,6617,1003,1,6641,1003,1,6665,1003,1,6689,1003,1,6713,1003,1,6737,1003,1,6761,1003,1,6785,1003,1,6809,1003,1,6833,1003,1,6857,1003,1,6881,1003,1,6905,1003,1,6929,1003,1,6953,1003,1,6977,1003,1,7001,1003,1,7025,1003,1,7049,1003,1,7073,1003,1,7097,1003,1,7121,1003,1,7145,1003,1,7169,1003,1,7193,1003,1,7217,1003,1,7241,1003,1,7265,1003,1,7289,1003,1,7313,1003,1,7337,1003,1,7361,1003,1,7385,1003,1,7409,1003,1,7433,1003,1,7457,1003,1,7481,1003,1,7505,1003,1,7529,1003,1,7553,1003,1,7577,1003,1,7601,1003,1,7625,1003,1,7649,1003,1,7673,1003,1,7697,1003,1,7721,1003,1,7745,1003,1,7769,1003,1,7793,1003,1,7817,1003,1,7841,1003,1,7865,1003,1,7889,1003,1,7913,1003,1,7937,1003,1,7961,1003,1,7985,1003,1,8009,1003,1,8033,1003,1,8057,1003,1,8081,1003,1,8105,1003,1,8129,1003,1,8153,1003,1,8177,1003,1,8201,1003,1,8225,1003,1,8249,1003,1,8273,1003,1,8297,1003,1,8321,1003,1,8345,1003,1,8369,1003,1,8393,1003,1,8417,1003,1,8441,1003,1,8465,1003,1,8489,1003,1,8513,1003,1,8537,1003,1,8561,1003,1,8585,1003,1,8609,1003,1,8633,1003,1,8657,1003,1,8681,1003,1,8705,1003,1,8729,1003,1,8753,1003,1,8777,1003,1,8801,1003,1,8825,1003,1,8849,1003,1,8873,1003,1,8897,1003,1,8921,1003,1,8945,1003,1,8969,1003,1,8993,1003,1,9017,1003,1,9041,1003,1,9065,1003,1,9089,1003,1,9113,1003,1,9137,1003,1,9161,1003,1,9185,1003,1,9209,1003,1,9233,1003,1,9257,1003,1,9281,1003,1,9305,1003,1,9329,1003,1,9353,1003,1,9377,1003,1,9401,1003,1,9425,1003,1,9449,1003,1,9473,1003,1,9497,1003,1,9521,1003,1,9545,1003,1,9569,1003,1,9593,1003,1,9617,1003,1,9641,1003,1,9665,1003,1,9689,1003,1,9713,1003,1,9737,1003,1,9761,1003,1,9785,1003,1,9809,1003,1,9833,1003,1,9857,1003,1,9881,1003,1,9905,1003,1,9929,1003,1,9953,1003,1,9977,1003,1,10001,1003,1,10025,1003,1,10049,1003,1,10073,1003,1,10097,1003,1,10121,1003,1,10145,1003,1,10169,1003,1,10193,1003,1,10217,1003,1,10241,1003,1,10265,1003,1,10289,1003,1,10313,1003,1,10337,1003,1,10361,1003,1,10385,1003,1,10409,1003,1,10433,1003,1,10457,1003,1,10481,1003,1,10505,1003,1,10529,1003,1,10553,1003,1,10577,1003,1,10601,1003,1,10625,1003,1,10649,1003,1,10673,1003,1,10697,1003,1,10721,1003,1,10745,1003,1,10769,1003,1,10793,1003,1,10817,1003,1,10841,1003,1,10865,1003,1,10889,1003,1,10913,1003,1,10937,1003,1,10961,1003,1,10985,1003,1,11009,1003,1,11033,1003,1,11057,1003,1,11081,1003,1,11105,1003,1,11129,1003,1,11153,1003,1,11177,1003,1,11201,1003,1,11225,1003,1,11249,1003,1,11273,1003,1,11297,1003,1,11321,1003,1,11345,1003,1,11369,1003,1,11393,1003,1,11417,1003,1,11441,1003,1,11465,1003,1,11489,1003,1,11513,1003,1,11537,1003,1,11561,1003,1,11585,1003,1,11609,1003,1,11633,1003,1,11657,1003,1,11681,1003,1,11705,1003,1,11729,1003,1,11753,1003,1,11777,1003,1,11801,1003,1,11825,1003,1,11849,1003,1,11873,1003,1,11897,1003,1,11921,1003,1,11945,1003,1,11969,1003,1,11993,1003,1,12017,1003,1,12041,1003,1,12065,1003,1,12089,1003,1,12113,1003,1,12137,1003,1,12161,1003,1,12185,1003,1,12209,1003,1,12233,1003,1,12257,1003,1,12281,1003,1,12305,1003,1,12329,1003,1,12353,1003,1,12377,1003,1,12401,1003,1,12425,1003,1,12449,1003,1,12473,1003,1,12497,1003,1,12521,1003,1,12545,1003,1,12569,1003,1,12593,1003,1,12617,1003,1,12641,1003,1,12665,1003,1,12689,1003,1,12713,1003,1,12737,1003,1,12761,1003,1,12785,1003,1,12809,1003,1,12833,1003,1,12857,1003,1,12881,1003,1,12905,1003,1,12929,1003,1,12953,1003,1,12977,1003,1,13001,1003,1,13025,1003,1,13049,1003,1,13073,1003,1,13097,1003,1,13121,1003,1,13145,1003,1,13169,1003,1,13193,1003,1,13217,1003,1,13241,1003,1,13265,1003,1,13289,1003,1,13313,1003,1,13337,1003,1,13361,1003,1,13385,1003,1,13409,1003,1,13433,1003,1,13457,1003,1,13481,1003,1,13505,1003,1,13529,1003,1,13553,1003,1,13577,1003,1,13601,1003,1,13625,1003,1,13649,1003,1,13673,1003,1,13697,1003,1,13721,1003,1,13745,1003,1,13769,1003,1,13793,1003,1,13817,1003,1,13841,1003,1,13865,1003,1,13889,1003,1,13913,1003,1,13937,1003,1,13961,1003,1,13985,1003,1,14009,1003,1,14033,1003,1,14057,1003,1,14081,1003,1,14105,1003,1,14129,1003,1,14153,1003,1,14177,1003,1,14201,1003,1,14225,1003,1,14249,1003,1,14273,1003,1,14297,1003,1,14321,1003,1,14345,1003,1,14369,1003,1,14393,1003,1,14417,1003,1,14441,1003,1,14465,1003,1,14489,1003,1,14513,1003,1,14537,1003,1,14561,1003,1,14585,1003,1,14609,1003,1,14633,1003,1,14657,1003,1,14681,1003,1,14705,1003,1,14729,1003,1,14753,1003,1,14777,1003,1,14801,1003,1,14825,1003,1,14849,1003,1,14873,1003,1,14897,1003,1,14921,1003,1,14945,1003,1,14969,1003,1,14993,1003,1,15017,1003,1,15041,1003,1,15065,1003,1,15089,1003,1,15113,1003,1,15137,1003,1,15161,1003,1,15185,1003,1,15209,1003,1,15233,1003,1,15257,1003,1,15281,1003,1,15305,1003,1,15329,1003,1,15353,1003,1,15377,1003,1,15401,1003,1,15425,1003,1,15449,1003,1,15473,1003,1,15497,1003,1,15521,1003,1,15545,1003,1,15569,1003,1,15593,1003,1,15617,1003,1,15641,1003,1,15665,1003,1,15689,1003,1,15713,1003,1,15737,1003,1,15761,1003,1,15785,1003,1,15809,1003,1,15833,1003,1,15857,1003,1,15881,1003,1,15905,1003,1,15929,1003,1,15953,1003,1,15977,1003,1,16001,1003,1,16025,1003,1,16049,1003,1,16073,1003,1,16097,1003,1,16121,1003,1,16145,1003,1,16169,1003,1,16193,1003,1,16217,1003,1,16241,1003,1,16265,1003,1,16289,1003,1,16313,1003,1,16337,1003,1,16361,1003,1,16385,1003,1,16409,1003,1,16433,1003,1,16457,1003,1,16481,1003,1,16505,1003,1,16529,1003,1,16553,1003,1,16577,1003,1,16601,1003,1,16625,1003,1,16649,1003,1,16673,1003,1,16697,1003,1,16717,1003,1,16741,1003,1,16765,1003,1,16789,1003,1,16813,1003,1,16837,1003,1,16861,1003,1,16885,1003,1,16909,1003,1,16933,1003,1,16957,1003,1,16981,1003,1,17005,1003,1,17029,1003,1,17053,1003,1,17077,1003,1,17101,1003,1,17125,1003,1,17149,1003,1,17173,1003,1,17197,1003,1,17221,1003,1,17245,1003,1,17269,1003,1,17293,1003,1,17317,1003,1,17341,1003,1,17365,1003,1,17389,1003,1,17413,1003,1,17437,1003,1,17461,1003,1,17485,1003,1,17509,1003,1,17533,1003,1,17557,1003,1,17581,1003,1,17605,1003,1,17629,1003,1,17653,1003,1,17677,1003,1,17701,1003,1,17725,1003,1,17749,1003,1,17773,1003,1,17797,1003,1,17821,1003,1,17845,1003,1,17869,1003,1,17893,1003,1,17917,1003,1,17941,1003,1,17965,1003,1,17989,1003,1,18013,1003,1,18037,1003,1,18061,1003,1,18085,1003,1,18109,1003,1,18133,1003,1,18157,1003,1,18181,1003,1,18205,1003,1,18229,1003,1,18253,1003,1,18277,1003,1,18301,1003,1,18325,1003,1,18349,1003,1,18373,1003,1,18397,1003,1,18421,1003,1,18445,1003,1,18469,1003,1,18493,1003,1,18517,1003,1,18541,1003,1,18565,1003,1,18589,1003,1,18613,1003,1,18637,1003,1,18661,1003,1,18685,1003,1,18709,1003,1,18733,1003,1,18757,1003,1,18781,1003,1,18805,1003,1,18829,1003,1,18853,1003,1,18877,1003,1,18901,1003,1,18925,1003,1,18949,1003,1,18973,1003,1,18997,1003,1,19021,1003,1,19045,1003,1,19069,1003,1,19093,1003,1,19117,1003,1,19141,1003,1,19165,1003,1,19189,1003,1,19213,1003,1,19237,1003,1,19261,1003,1,19285,1003,1,19309,1003,1,19333,1003,1,19357,1003,1,19381,1003,1,19405,1003,1,19429,1003,1,19453,1003,1,19477,1003,1,19501,1003,1,19525,1003,1,19549,1003,1,19573,1003,1,19597,1003,1,19621,1003,1,19645,1003,1,19669,1003,1,19693,1003,1,19717,1003,1,19741,1003,1,19765,1003,1,19789,1003,1,19813,1003,1,19837,1003,1,19861,1003,1,19885,1003,1,19909,1003,1,19933,1003,1,19957,1003,1,19981,1003,1,20005,1003,1,20029,1003,1,20053,1003,1,20077,1003,1,20101,1003,1,20125,1003,1,20149,1003,1,20173,1003,1,20197,1003,1,20221,1003,1,20245,1003,1,20269,1003,1,20293,1003,1,20317,1003,1,20341,1003,1,20365,1003,1,20389,1003,1,20413,1003,1,20437,1003,1,20461,1003,1,20485,1003,1,20509,1003,1,20533,1003,1,20557,1003,1,20581,1003,1,20605,1003,1,20629,1003,1,20653,1003,1,20677,1003,1,20701,1003,1,20725,1003,1,20749,1003,1,20773,1003,1,20797,1003,1,20821,1003,1,20845,1003,1,20869,1003,1,20893,1003,1,20917,1003,1,20941,1003,1,20965,1003,1,20989,1003,1,21013,1003,1,21037,1003,1,21061,1003,1,21085,1003,1,21109,1003,1,21133,1003,1,21157,1003,1,21181,1003,1,21205,1003,1,21229,1003,1,21253,1003,1,21277,1003,1,21301,1003,1,21325,1003,1,21349,1003,1,21373,1003,1,21397,1003,1,21421,1003,1,21445,1003,1,21469,1003,1,21493,1003,1,21517,1003,1,21541,1003,1,21565,1003,1,21589,1003,1,21613,1003,1,21637,1003,1,21661,1003,1,21685,1003,1,21709,1003,1,21733,1003,1,21757,1003,1,21781,1003,1,21805,1003,1,21829,1003,1,21853,1003,1,21877,1003,1,21901,1003,1,21925,1003,1,21949,1003,1,21973,1003,1,21997,1003,1,22021,1003,1,22045,1003,1,22069,1003,1,22093,1003,1,22117,1003,1,22141,1003,1,22165,1003,1,22189,1003,1,22213,1003,1,22237,1003,1,22261,1003,1,22285,1003,1,22309,1003,1,22333,1003,1,22357,1003,1,22381,1003,1,22405,1003,1,22429,1003,1,22453,1003,1,22477,1003,1,22501,1003,1,22525,1003,1,22549,1003,1,22573,1003,1,22597,1003,1,22621,1003,1,22645,1003,1,22669,1003,1,22693,1003,1,22717,1003,1,22741,1003,1,22765,1003,1,22789,1003,1,22813,1003,1,22837,1003,1,22861,1003,1,22885,1003,1,22909,1003,1,22933,1003,1,22957,1003,1,22981,1003,1,23005,1003,1,23029,1003,1,23053,1003,1,23077,1003,1,23101,1003,1,23125,1003,1,23149,1003,1,23173,1003,1,23197,1003,1,23221,1003,1,23245,1003,1,23269,1003,1,23293,1003,1,23317,1003,1,23341,1003,1,23365,1003,1,23389,1003,1,23413,1003,1,23437,1003,1,23461,1003,1,23485,1003,1,23509,1003,1,23533,1003,1,23557,1003,1,23581,1003,1,23605,1003,1,23629,1003,1,23653,1003,1,23677,1003,1,23701,1003,1,23725,1003,1,23749,1003,1,23773,1003,1,23797,1003,1,23821,1003,1,23845,1003,1,23869,1003,1,23893,1003,1,23917,1003,1,23941,1003,1,23965,1003,1,23989,1003,1,24013,1003,1,24037,1003,1,24061,1003,1,24085,1003,1,24109,1003,1,24133,1003,1,24157,1003,1,24181,1003,1,24205,1003,1,24229,1003,1,24253,1003,1,24277,1003,1,24301,1003,1,24325,1003,1,24349,1003,1,24373,1003,1,24397,1003,1,24421,1003,1,24445,1003,1,24469,1003,1,24493,1003,1,24517,1003,1,24541,1003,1,24565,1003,1,24589,1003,1,24613,1003,1,24637,1003,1,24661,1003,1,24685,1003,1,24709,1003,1,24733,1003,1,24757,1003,1,24781,1003,1,24805,1003,1,24829,1003,1,24853,1003,1,24877,1003,1,24901,1003,1,24925,1003,1,24949,1003,1,24973,1003,1,24997,1003,1,25021,1003,1,25045,1003,1,25069,1003,1,25093,1003,1,25117,1003,1,25141,1003,1,25165,1003,1,25189,1003,1,25213,1003,1,25237,1003,1,25261,1003,1,25285,1003,1,25309,1003,1,25333,1003,1,25357,1003,1,25381,1003,1,25405,1003,1,25429,1003,1,25453,1003,1,25477,1003,1,25501,1003,1,25525,1003,1,25549,1003,1,25573,1003,1,25597,1003,1,25621,1003,1,25645,1003,1,2566			

# Oracle Spatial SQL Operatoren

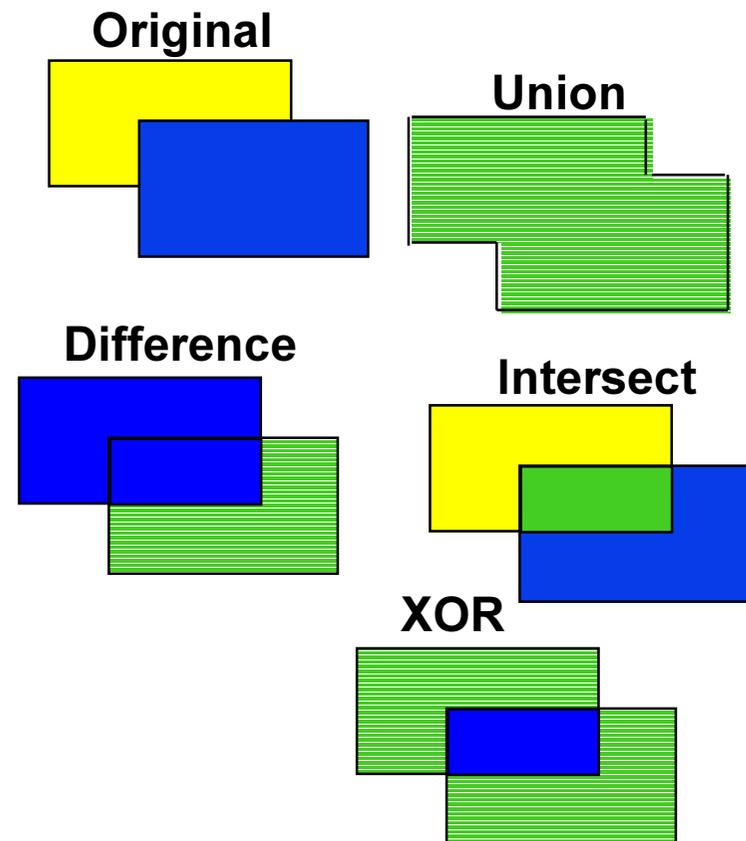
- Enge SQL-Integration
  - "Topologische Operatoren"
    - Inside Contains
    - Touch Disjoin
    - Covers Covered By
    - Equal Overlap Boundary
  - "Distanz-Operatoren"
    - Within Distance
    - Nearest Neighbor



**Within Distance**

# Oracle Spatial SQL Funktionen

- Rückgabe: SDO\_GEOMETRY
  - Union
  - Difference
  - Intersect
  - XOR
  - Buffer
  - Centroid
  - ConvexHull
- Rückgabe: NUMBER
  - Length
  - Area
  - Distance
  - Volume



# Geometrische Operationen



- Wie groß ist Deutschland ...?

```
SQL> select sdo_geom.sdo_area(  
2     geometry, 1, 'unit=sq_km'  
3 ) "Fläche km²"  
4 from geo_staaten e  
5 where feature_name='GERMANY';
```

Einheit (km)

Fläche km<sup>2</sup>

-----  
356644,105

1 Zeile wurde ausgewählt.

# Kombinierte Abfragen

- Welche Kunden mit Umsatz sind in Brandenburg?

```
SQL> select name, umsatz
2   from customers c, geo_laender gl
3   where sdo_relate(
4     c.geometry, gl.geometry, 'mask=anyinteract'
5   ) = 'TRUE'
6   and gl.feature_name='Brandenburg'
7   and umsatz is not null and umsatz > 0
```

NAME	UMSATZ
-----	-----
Freie Tanke	4876
Marhoul	4798
Tankstelle Schönefeld	4598
Tankstelle Dreieck Havelland	7896
:	:

# Auswertungen

- Bundesländer nach Umsatz ...

```
SQL> select
  2   gl.feature_name, sum(c.umsatz) umsatz_gesamt
  3 from customers c, geo_laender gl
  4 where sdo_relate(
  5   c.geometry, gl.geometry, 'mask=anyinteract'
  6 ) = 'TRUE'
  7 and umsatz is not null and umsatz > 0
  8 group by gl.feature_name
```

FEATURE_NAME	UMSATZ_GESAMT
-----	-----
Bayern	5000
Berlin	77116
Brandenburg	62447
Niedersachsen	500
:	:

# Sonderfall "Nächster Nachbar"

- Die nächsten Nachbarn von "Carsten Czarski"

```
SQL> select
  2     c1.name, c1.umsatz, sdo_nn_distance(1) dist_km
  3 from customers c1, customers c2
  4 where c2.name = 'Carsten Czarski'
  5 and sdo_nn(
  6     c1.geometry,
  7     c2.geometry,
  8     'sdo_batch_size=0 unit=km',
  9     1
 10 ) = 'TRUE'
 11 and c1.umsatz is not null
 12 and c1.name != 'Carsten Czarski'
 13 and rownum<=5
```

# Sonderfall "Nächster Nachbar"

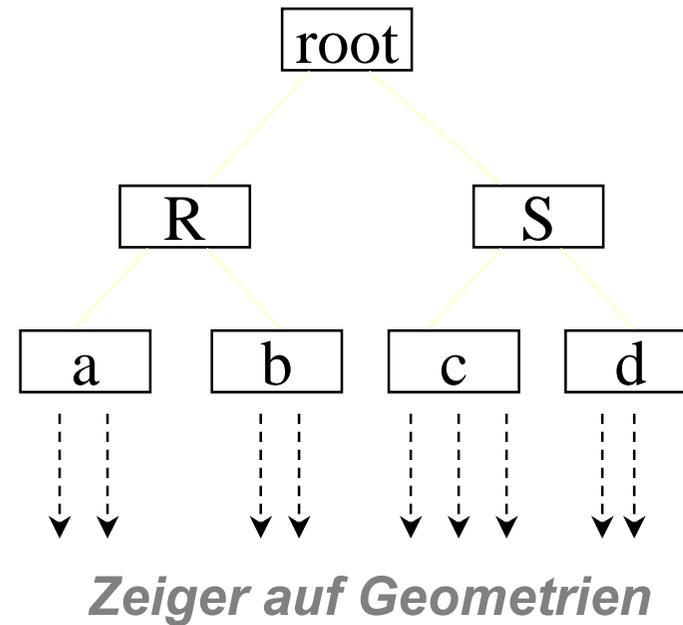
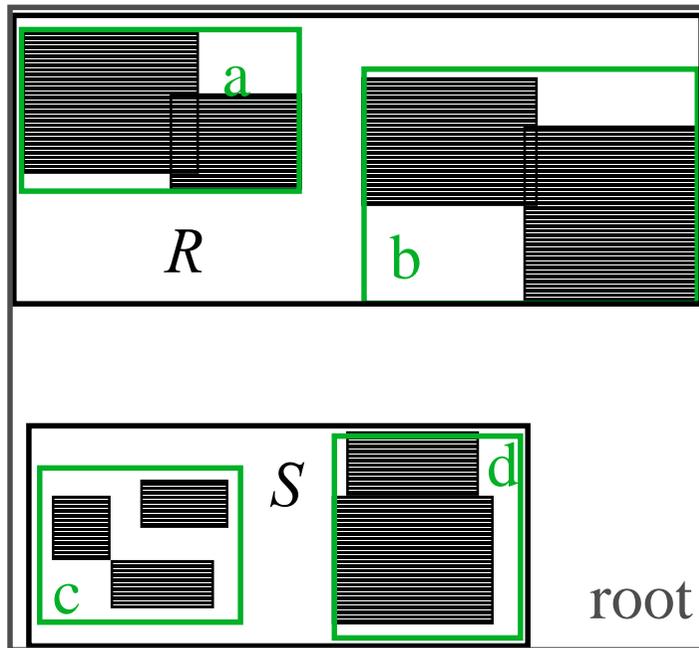
- Die nächsten Nachbarn von "Carsten Czarski"

NAME	UMSATZ	DIST_KM
Der Säubrenner	100	2,62556936
Michael Künzner	2300	8,45149714
Eifel Power II	2000	8,61981335
Jörn Huber	4000	9,41099027
Mike Müller	0	15,8498991

5 Zeilen ausgewählt.

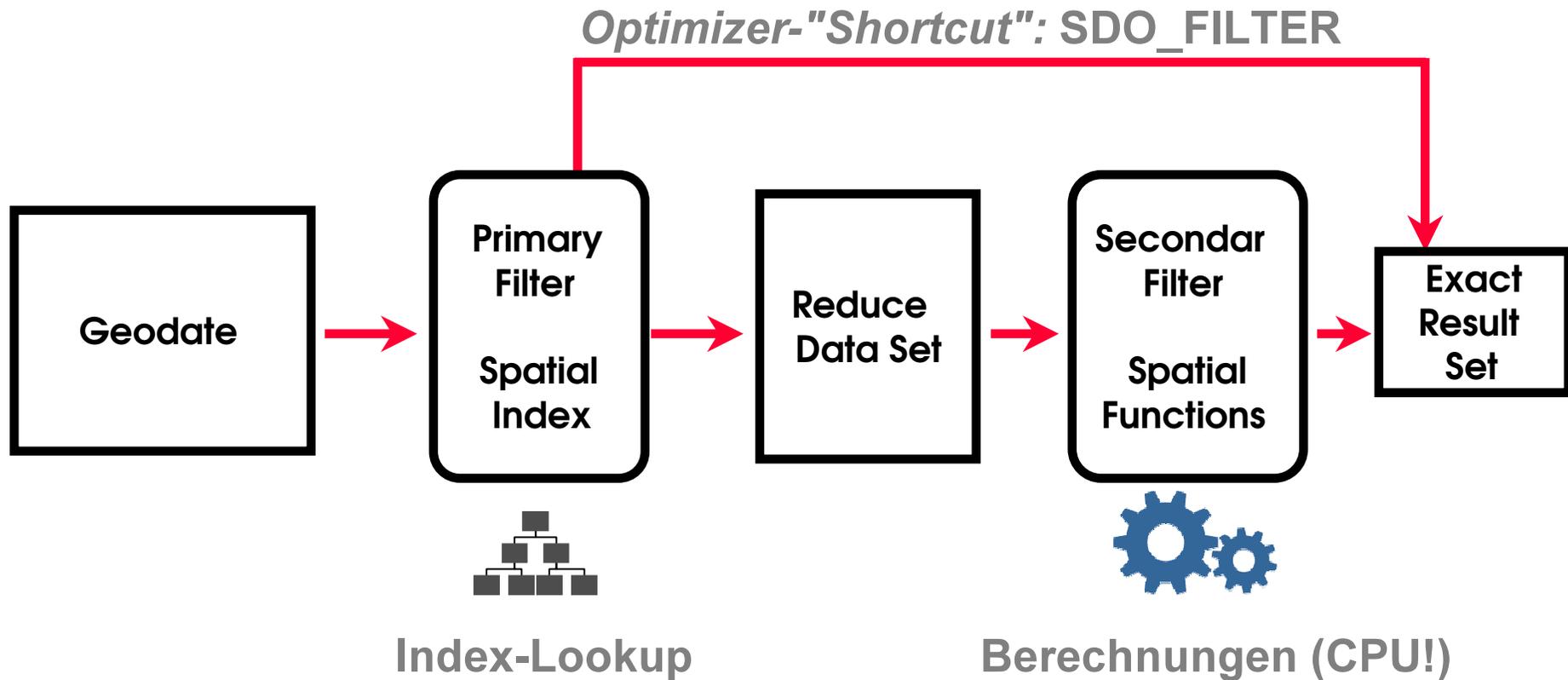
# Spatial Index

## Aufbau des R-Tree-Index

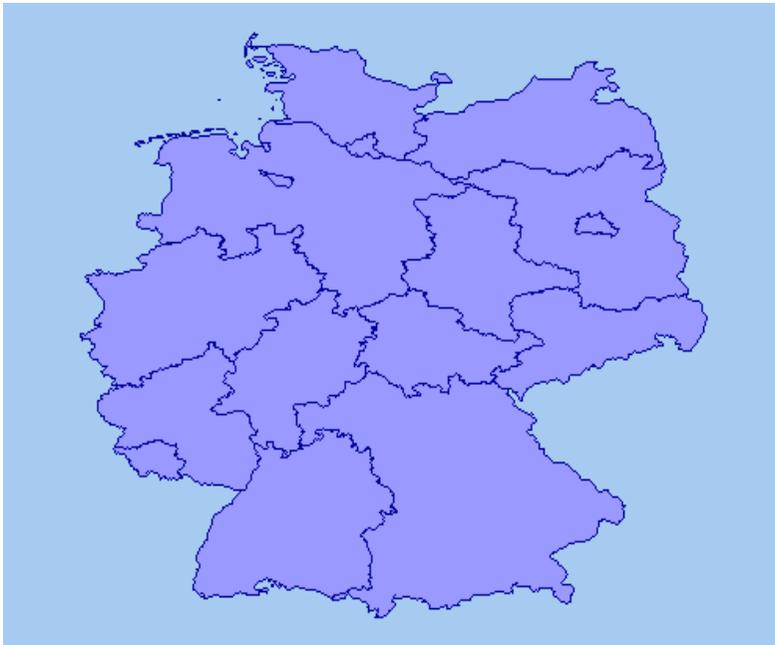


# Nutzung des Spatial-Index

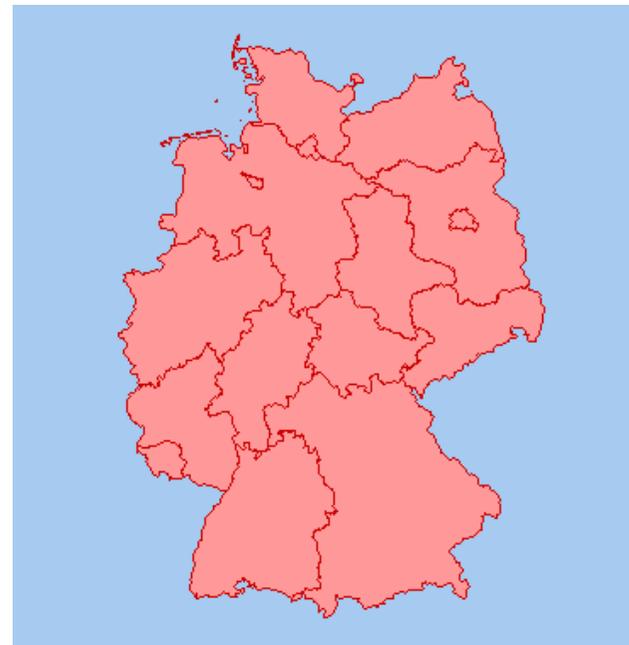
## Primär- und Sekundärfilter



# Koordinatensysteme



(Längen/Breitengrade)



Projektion

# Koordinatensysteme: EPSG

- Datenmodell für CS-Parameter
- SRID ist standardisiert

CS	EPSG_ID	SDO_ID
WGS84	4326	8307
ETRS89	25832	8220
GK 2 (Bessel)	31466	82015
GK 3 (Bessel)	31467	82027
GK 4 (Bessel)	31468	82032
GK 5 (Bessel)	31469	82034
UTM Zone 32N (WGS84)	32632	82344
:	:	:

# EPSG-Koordinatensysteme

## Anwendungsfall WMS

- REQUEST=getCapabilities

```
- <Layer queryable="0" opaque="0" noSubsets="0">  
  <Name>Germany</Name>  
  <Title>Germany</Title>  
  <SRS>epsg:4326</SRS>  
  <SRS>epsg:31467</SRS>  
  <SRS>epsg:31466</SRS>  
  <SRS>epsg:31468</SRS>  
  <SRS>epsg:31469</SRS>  
  <SRS>epsg:31492</SRS>  
  <SRS>epsg:31493</SRS>  
  <SRS>epsg:31494</SRS>  
  <SRS>epsg:31495</SRS>  
  <SRS>epsg:31462</SRS>  
  <SRS>epsg:31463</SRS>  
  <SRS>epsg:31464</SRS>  
  <SRS>epsg:31465</SRS>  
  <SRS>epsg:25832</SRS>  
  <SRS>epsg:25833</SRS>  
  <SRS>epsg:31287</SRS>  
  <SRS>epsg:32633</SRS>  
  <SRS>epsg:2398</SRS>  
  <LatLonBoundingBox minx="5.60075" miny="47.2441" maxx="15.425"
```

# EPSG-Koordinatensysteme

- Nicht nur die SRID ist standardisiert ...

## ***8307 Longitude / Latitude (WGS 84)***

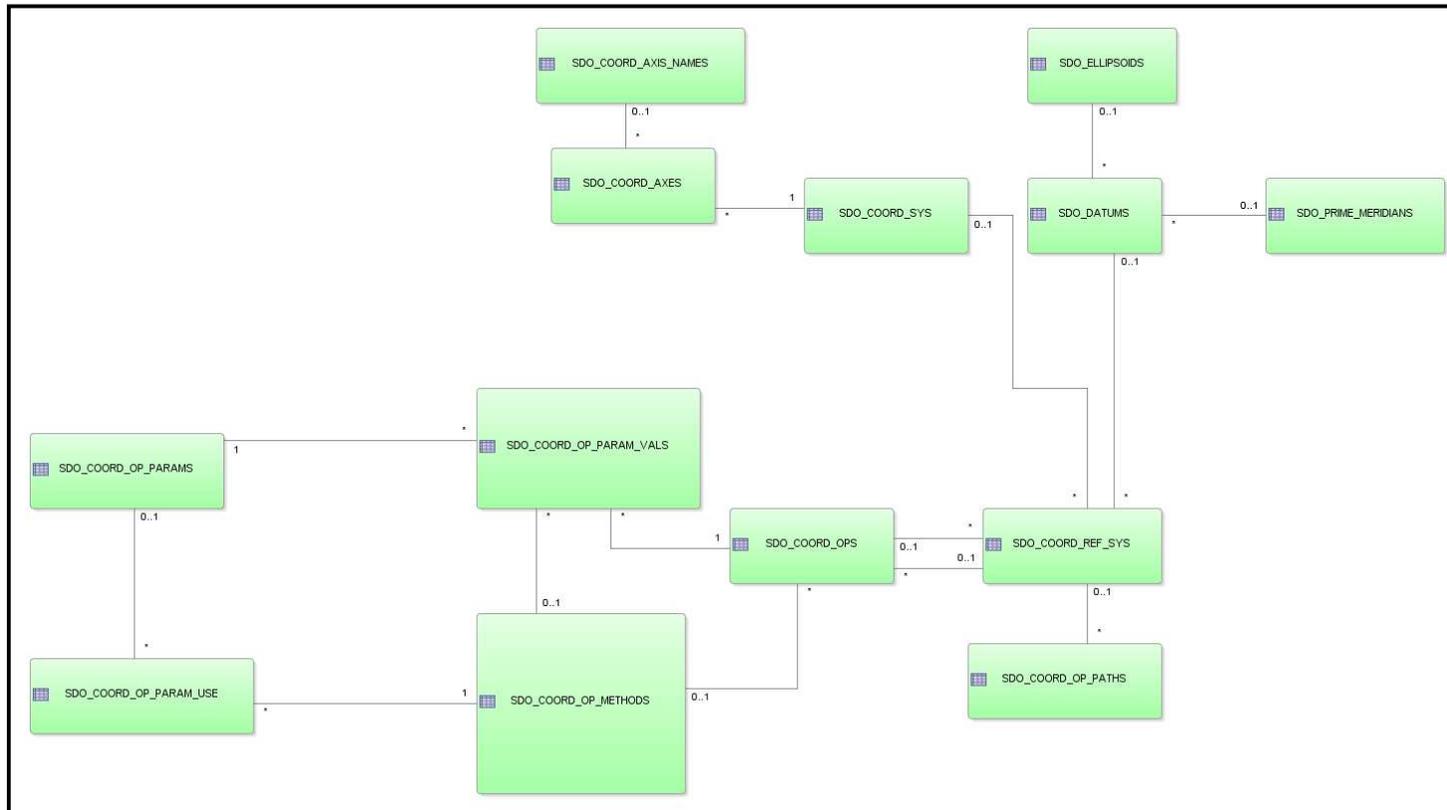
```
GEOGCS [ "Longitude / Latitude (WGS 84)", DATUM  
M ["WGS 84", SPHEROID ["WGS 84", 6378137, 298.  
257223563]], PRIMEM [ "Greenwich", 0.000000 ],  
UNIT ["Decimal Degree", 0.01745329251994330]]
```

## ***4326 WGS 84***

```
GEOGCS [ "WGS 84", DATUM ["World Geodetic Syst  
em 1984 (EPSG ID 6326)", SPHEROID ["WGS 84 (EP  
SG ID 7030)", 6378137, 298.257223563]], PRIMEM  
[ "Greenwich", 0.000000 ], UNIT ["Decimal Degr  
ee", 0.01745329251994328]]
```

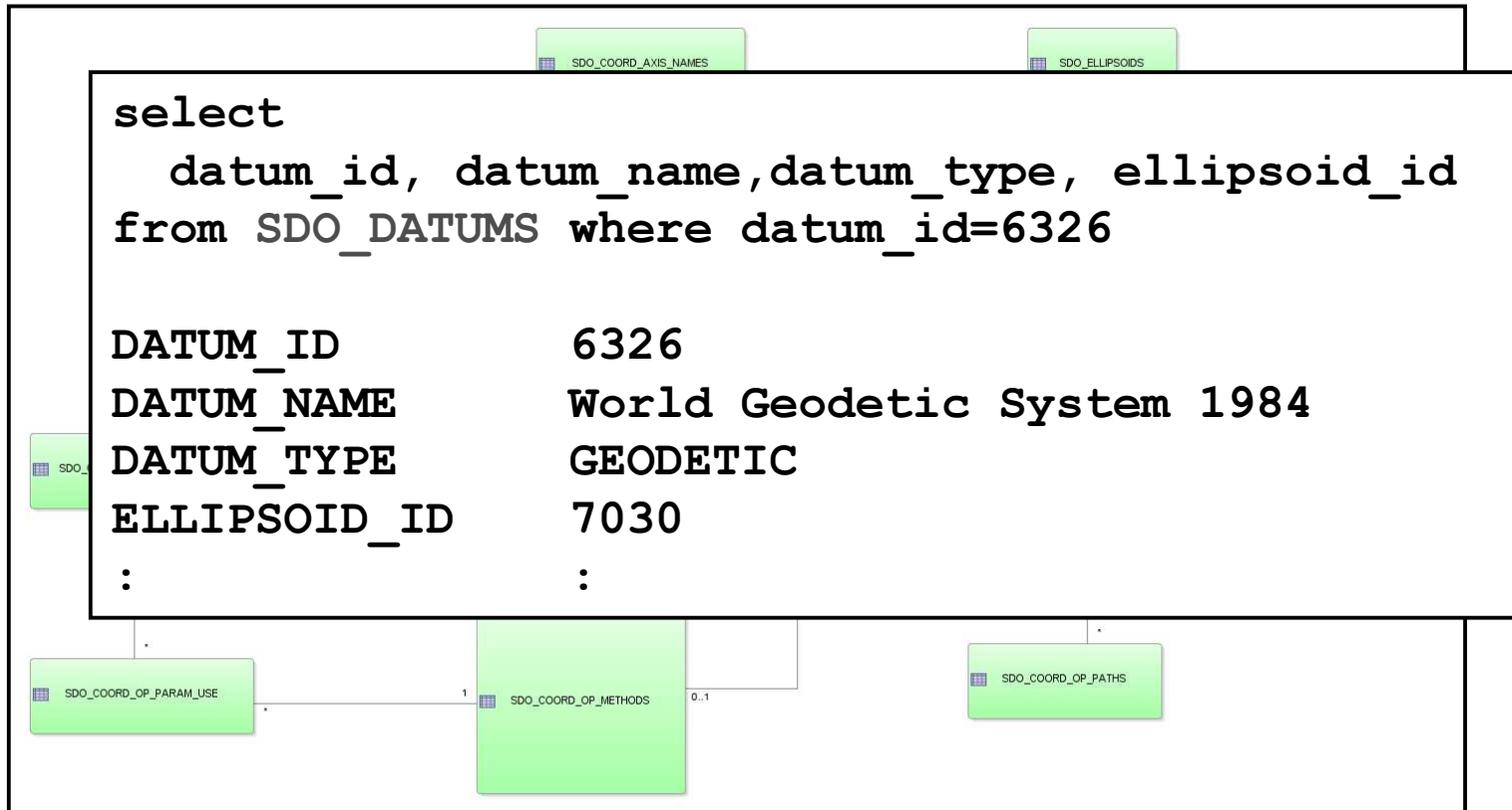
# EPSG-Komponenten

- EPSG-Datenmodell (Auszug)



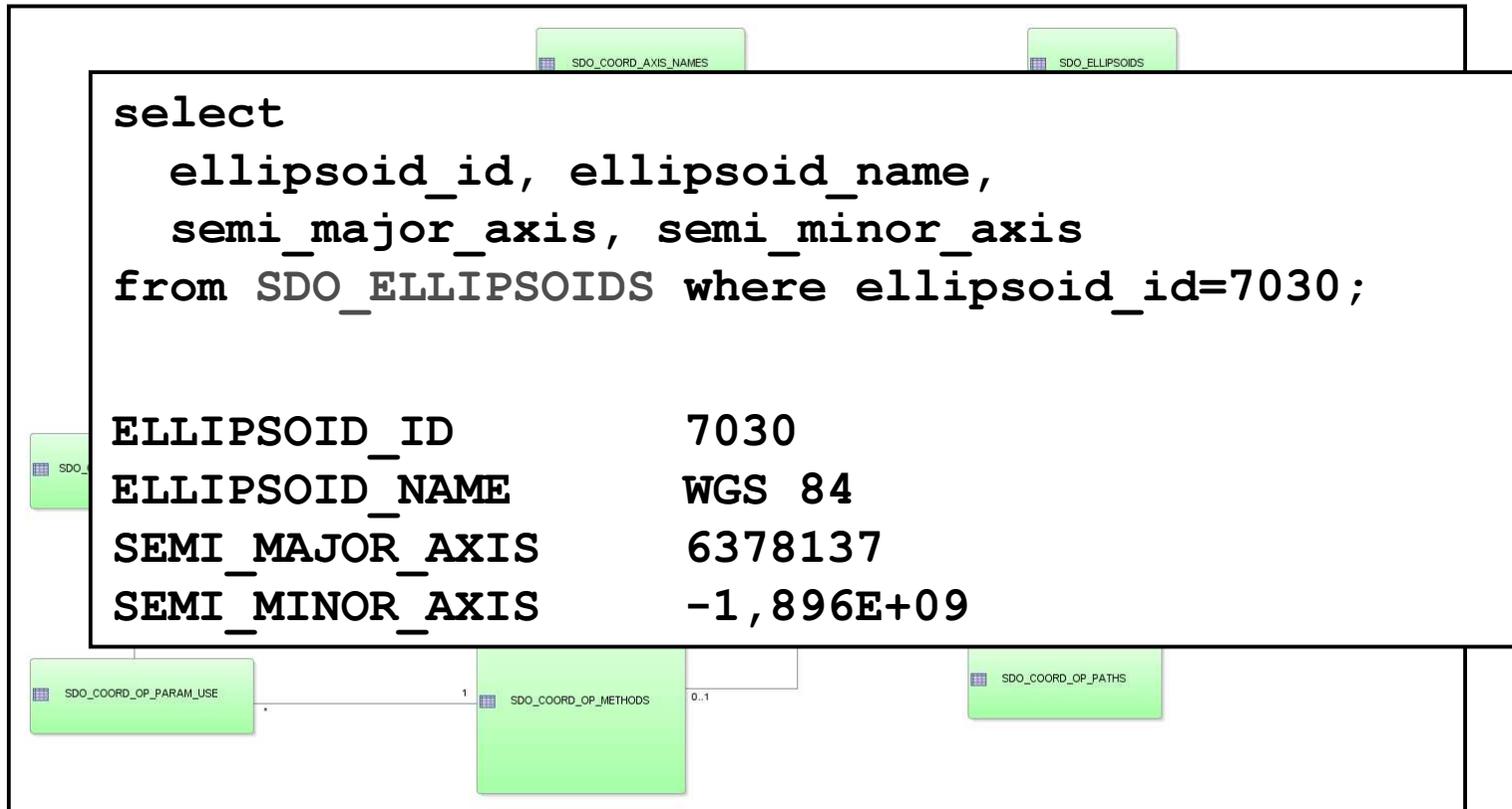
# EPSG-Komponenten

- EPSG-Datenmodell (Auszug)



# EPSG-Komponenten

- EPSG-Datenmodell (Auszug)

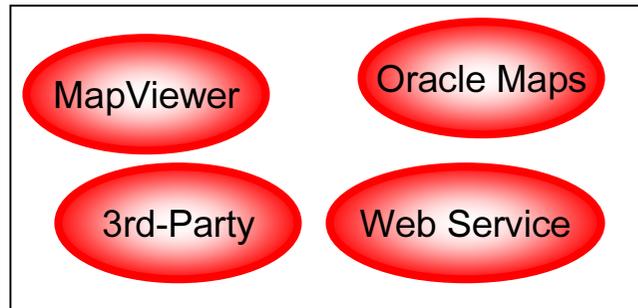


# Das Fundament: Die Oracle-Datenbank

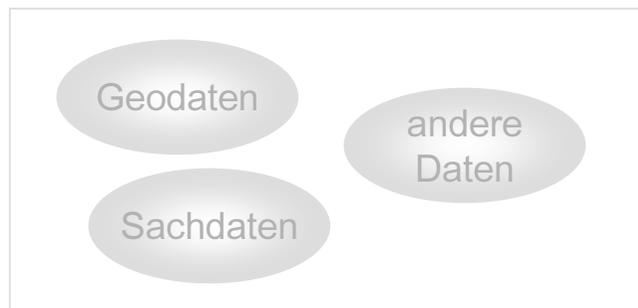
## Offene Geodaten – offene Plattform!



Oracle Application Server



Oracle Application Server



Oracle Database

Konkrete Lösungsapplikation  
Fachliche Lösungen

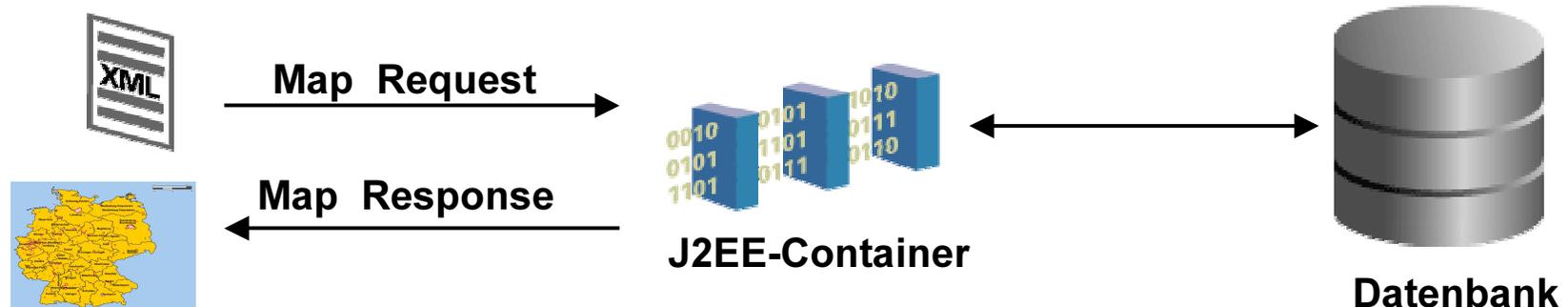
Kartendarstellung  
WMS / WFS (-T)  
Routenberechnung

Geodaten / Räumliche Abfragen  
Räumliche Indizes  
Verschneidungen  
Daten-Manipulationen

# Visualisierung der Geodaten

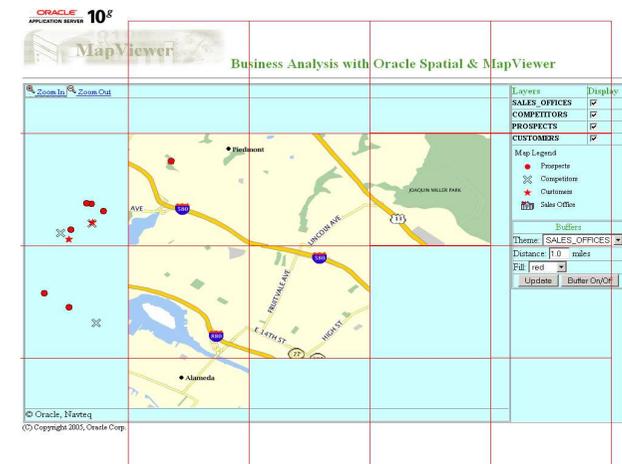
## Oracle MapViewer

- Karten-Rendering für ...  
Vektordaten, Rasterdaten, Netzwerke, Topologien
- Unterstützung für WMS (Client / Server)
- Architektur: J2EE
  - Lizenz: Oracle Application Server: Java Edition



# Oracle MapViewer: Oracle Maps!

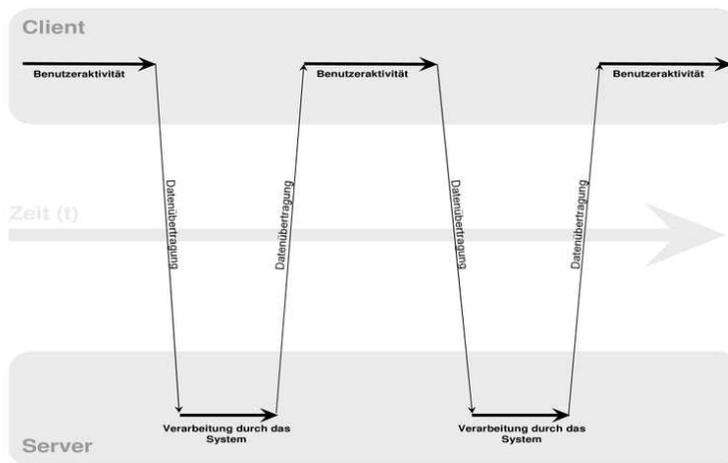
- Kartendarstellung *state-of-the-art*
  - Drag & Drop
  - Einfaches Zoom In & Zoom Out
  - Hinzufügen neuer Geometrien
  - Dynamisches Einblenden weitere Informationen
- AJAX-Technologie
  - JavaScript Client



# Event-Modell einer Web-Anwendung

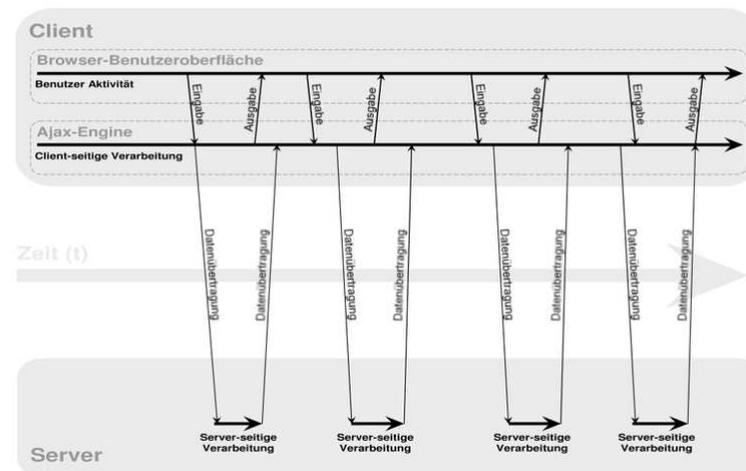
- "AJAX" Event-Modell
  - JavaScript-Komponente sendet *Request* ...  
... und empfängt *XML Response*
  - DHTML zur Änderung der Web-Seite

Klassisches Modell einer Web-Anwendung (synchrone Datenübertragung)



"Klassisches" Modell

Ajax-Modell einer Web-Anwendung (asynchrone Datenübertragung)



"AJAX"-Modell

# Oracle MapViewer

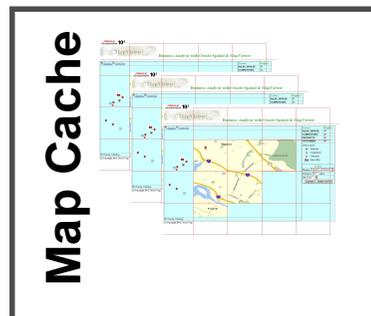
## Oracle Maps: AJAX-Architektur

Client

- Browser (HTML)
- JavaScript (AJAX)



XML/HTTP

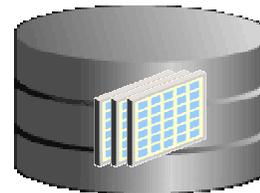


### MapViewer

SDOVIS (rendering engine)  
MapCache Server  
FOI Server

OracleAS  
(OC4J)

JDBC

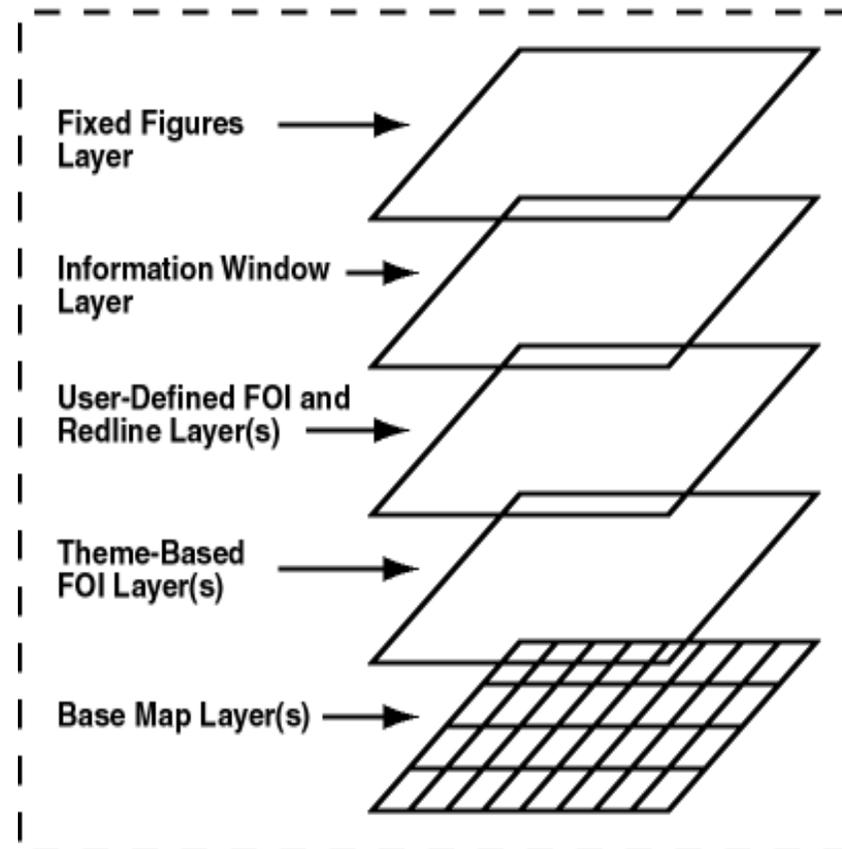


Datenbank

# Oracle Maps Aufbau einer Karte

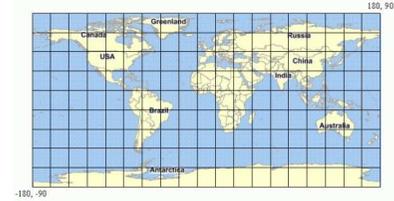
- *Base map*
  - Statisch
  - Kacheln im Map Cache
- *Theme based FOI*
  - Interaktiv
  - Datenbank-Query
- *User Defined FIO*
  - Interaktiv
  - Anwendungsspezifisch
- *Information Window*

Map Container HTML DIV Object



# Map Cache Server

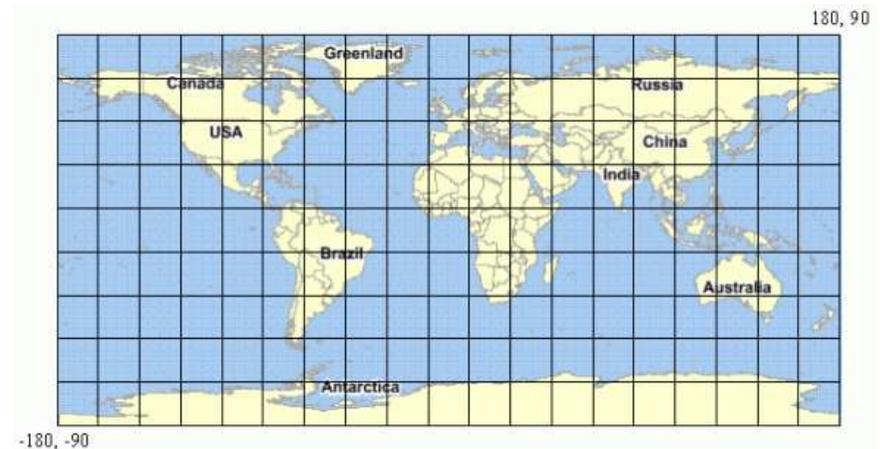
## Die Basis für schnelle Karten



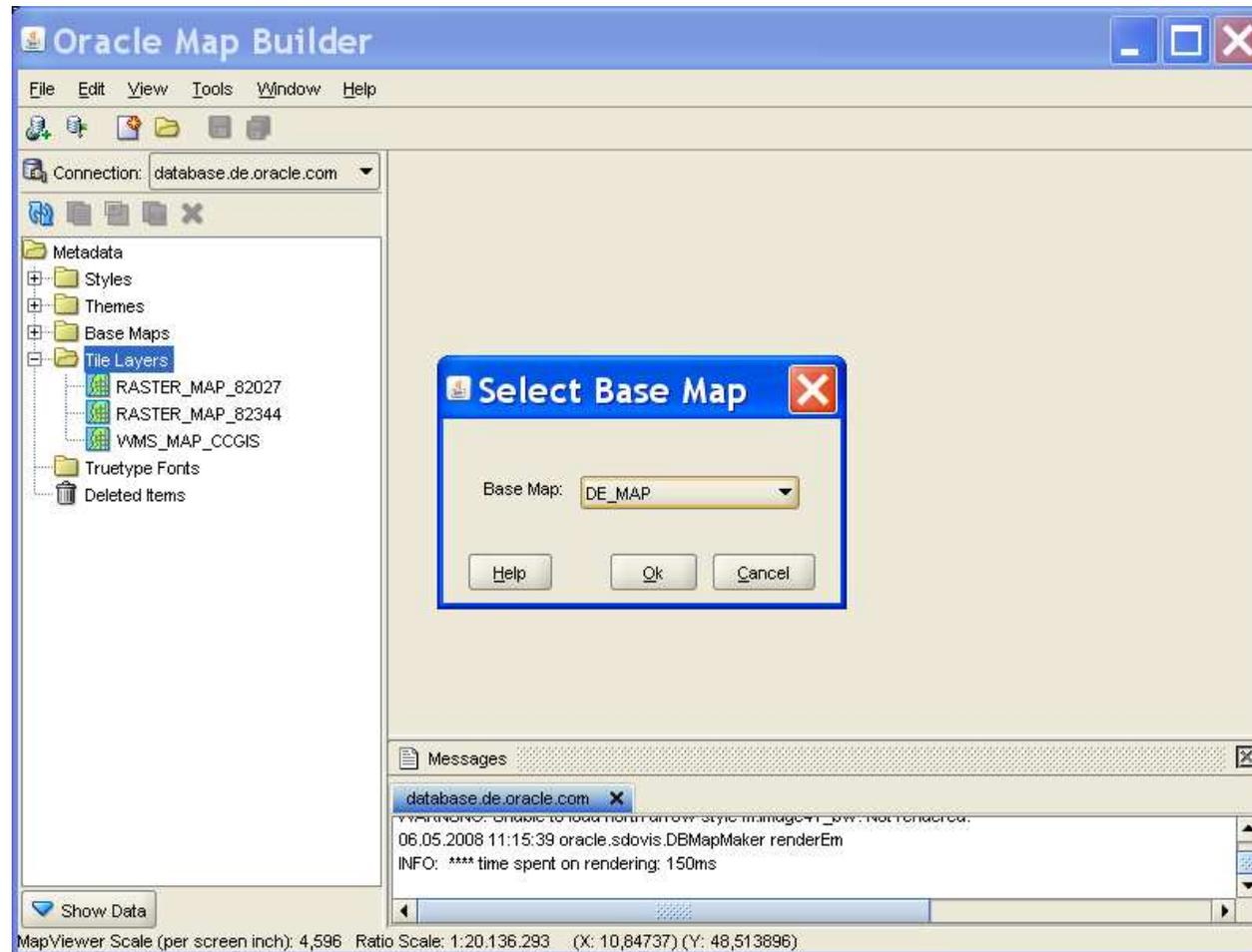
- Cache für Karten-Bilddateien
  - Kachelung der Karten
  - Caching der einzelnen Kacheln
  - Auslieferung auf Anfrage durch Client API
- Aufbau des Map Cache
  - Nach Zoom Level
  - Base Map
- Speicherung im Dateisystem

# Map Cache und Koordinatensysteme

- Alle Koordinatensysteme möglich
  - Angabe einer SRID in Map Cache Definition
  - Bei Bedarf Transformation
- Geodätische Koordinaten: Alternativen
  - Vorherige Projektion: Bspw. GK 3
  - Kartesische Kachelung



# Erzeugen eines MapCache (Tile Layer) ... mit dem MapBuilder



# FOI Server

## FOI: Feature Of Interest

- Basis: Räumliche SQL-Abfrage
  - Wo wohnen unsere Kunden
  - Welche Vertriebsgebiete machen Umsatz
  - ...
- Abbildung als MapViewer *Theme*
  - Werkzeug: Oracle Map Builder
  - Speicherung in DB: USER\_SDO\_THEMES
- Ein- und Ausblenden mit JavaScript



# AJAX in Oracle Maps

## JavaScript Client-API

### All Classes

[MVBarChartStyle](#)  
[MVBarInfo](#)  
[MVBaseMap](#)  
[MVBucketSeries](#)  
[MVBucketStyle](#)  
[MVCircleTool](#)  
[MVFOI](#)  
[MVMapDecoration](#)  
[MVMapView](#)  
[MVNSDP](#)  
[MVNumericRangedBucket](#)  
[MVOverviewMap](#)  
[MVPieChartStyle](#)  
[MVPieSlice](#)  
[MVRectangleTool](#)  
[MVRedlineTool](#)  
[MVSdoGeometry](#)  
[MVSdoPointType](#)  
[MVStyleColor](#)  
[MVThemeBasedFOI](#)

### Overview Class [Tree](#) [Index](#)

[PREV](#) [NEXT](#)

[FRAMES](#) [NO FRAMES](#)

## Oracle Maps JavaScript Client API

The Oracle Maps JavaScript client API consists of interfaces and classes that the application can use to access the functionalities provided by the web browser based Oracle Maps Client. [MVMapView](#) is the main entry class for all map operations inside the web browser. Together with the rest of the all classes, it provides all essential interfaces for adding logic such as the following to your Web mapping applications:

- Create a map client instance and associate it with the map container DIV object created in the Web page.
- Configure map parameters such as map center and map zoom level.
- Create and manipulate base map layers.
- Create and manipulate theme-based FOI layers.
- Create and manipulate user-defined individual FOIs.
- Display an information window on the map.
- Create fixed map decoration, such as map title, custom copyright notes and control buttons.
- Access the built-in utilities such as navigation bar, scale bar, rectangle tool, redline tool, overview map, etc.
- Use event listeners to customize the event handling. You can add event listeners to the MapView, ThemeBasedFOI, and FOI classes using the appropriate API methods.

The following is an example application written with the Oracle Maps JavaScript client API.

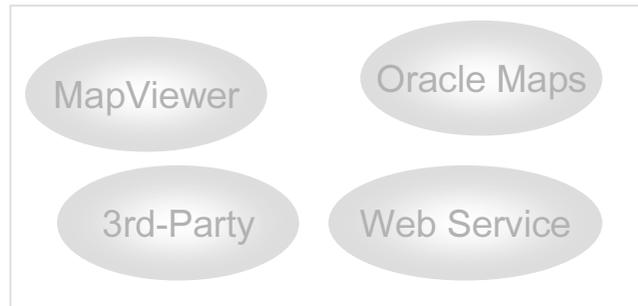
```
<html>
<head>
<TITLE>Map Cache Server/Map Client
<script language="Javascript" src="jslib/oraclemaps.js">
```

# Das Fundament: Die Oracle-Datenbank

## Offene Geodaten – offene Plattform!



Oracle Application Server



Oracle Application Server



Oracle Database

Konkrete Lösungsapplikation  
Fachliche Lösungen

Kartendarstellung  
WMS / WFS (-T)  
Routenberechnung

Geodaten / Räumliche Abfragen  
Räumliche Indizes  
Verschneidungen  
Daten-Manipulationen

# Das Ergebnis:

## Eine Anwendung mit Oracle MAPS

**Karte ...**

Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT

**Aktionen ...**

- [Zoom-Funktion aktivieren](#)
- [Kunden verbergen](#)
- [Freie NAVTEQ-Daten anzeigen](#)
- [Alle NAVTEQ-Daten anzeigen](#)
- [Rasterdaten anzeigen](#)

**Auswertungen ...**

Land	Anzahl	Umsatz
<a href="#">Rheinland-Pfalz</a>	14	67791
<a href="#">Brandenburg</a>	13	60049
<a href="#">Berlin</a>	6	79514
<a href="#">Bayern</a>	3	2015000
<a href="#">Saarland</a>	3	6000
<a href="#">Hessen</a>	2	1000
<a href="#">Niedersachsen</a>	1	500
<a href="#">Sachsen-Anhalt</a>	1	0
<a href="#">Schleswig-Holstein</a>	1	122
<a href="#">Nordrhein-Westfalen</a>	1	0

**Kontakt:** [Carsten Czarski](#) Business Unit Database

javascript:showBaseMap("FULLDATA");

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT Finden!

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten anzeigen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

Kontakt: Carsten Czarski Business Unit Database

javascript:showBaseMap("FULLDATA"); Proxy: Oracle

# Das Ergebnis:

## Eine Anwendung mit Oracle MAPS

**Karte ...**

Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT **Finden!**

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten anzeigen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

Kontakt: Carsten Czarski Business Unit Database

javascript:showBaseMap("FULLDATA");

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten anzeigen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

Kontakt: Carsten Czarski Business Unit Database

javascript:showBaseMap("FULLDATA"); Proxy: Oracle

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten verbergen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

Kontakt: Carsten Czarski Business Unit Database

Proxy: Oracle

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

The screenshot shows the Oracle Maps application running in Mozilla Firefox. The browser's address bar displays the URL: `http://technology.de.oracle.com/pls/htmltdb/?p=200:20:2822398166235978`. The application interface includes a navigation menu at the top with options like 'Einfache Geometrien', 'Räumliche Abfragen', 'Projektion', 'Beispielanwendung', 'Oracle Maps (in Arbeit)', and 'Daten-Import'. The main content area is divided into two sections: 'Karte ...' and 'Auswertungen ...'.

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT  
The map shows a satellite view of Darmstadt, Germany, with various streets and landmarks labeled. A red box on the map highlights the location of Darmstadt. Below the map, the contact information is listed: **Kontakt:** Carsten Czarski Business Unit Database.

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten verbergen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

The browser's status bar at the bottom shows the JavaScript code: `javascript:showBaseMap("RASTERDATA");` and the Oracle logo.

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT

**Aktionen ...**

- [Zoom-Funktion aktivieren](#)
- [Kunden verbergen](#)
- [Freie NAVTEQ-Daten anzeigen](#)
- [Alle NAVTEQ-Daten anzeigen](#)
- [Rasterdaten verbergen](#)

**Auswertungen ...**

Land	Anzahl	Umsatz
<a href="#">Rheinland-Pfalz</a>	14	67791
<a href="#">Brandenburg</a>	13	60049
<a href="#">Berlin</a>	6	79514
<a href="#">Bayern</a>	3	2015000
<a href="#">Saarland</a>	3	6000
<a href="#">Hessen</a>	2	1000
<a href="#">Niedersachsen</a>	1	500
<a href="#">Sachsen-Anhalt</a>	1	0
<a href="#">Schleswig-Holstein</a>	1	122
<a href="#">Nordrhein-Westfalen</a>	1	0

Kontakt: [Carsten Czarski](#) Business Unit Database

javascript:showBaseMap("RASTERDATA");

# Das Ergebnis: Eine Anwendung mit Oracle MAPS

**Karte ...**  
Adresse: RUNDETURMSTRASSE, 2, 64283, DARMSTADT **Finden!**

**Kunde ID: 10088** [bearbeiten]  
Name: InGeoForum  
Umsatz: 1000

**InGeoForum®**  
Die ganze Welt der Geodaten

**Kontakt:** Carsten Czarski Business Unit Database

**Aktionen ...**

- Zoom-Funktion aktivieren
- Kunden verbergen
- Freie NAVTEQ-Daten anzeigen
- Alle NAVTEQ-Daten anzeigen
- Rasterdaten verbergen

**Auswertungen ...**

Land	Anzahl	Umsatz
Rheinland-Pfalz	14	67791
Brandenburg	13	60049
Berlin	6	79514
Bayern	3	2015000
Saarland	3	6000
Hessen	2	1000
Niedersachsen	1	500
Sachsen-Anhalt	1	0
Schleswig-Holstein	1	122
Nordrhein-Westfalen	1	0

# MAPS weiter denken

## Externe Kartenquellen per WMS einbinden

- Interne (Datenbank) und externe Datenquellen
- Externe Datenquelle: WMS

Create a cache for external map source

Name:   
This name will be automatically prefixed with datasrc name.

Data Source:   
MapViewer data source; for storing cache instance configurations

---

Map service Url:

Request method:

HTTP proxy required

Adapter class:

Jar file location:   
complete path to the adapter Jar file on the server

Adapter properties

Select and

Properties:

Auswählen	name	value
<input checked="" type="radio"/>	SRS	EPSG:31467
<input type="radio"/>	LAYERS	TOPOGRAPHIE,STAEDTE,BUNDES
<input type="radio"/>	format	image/png

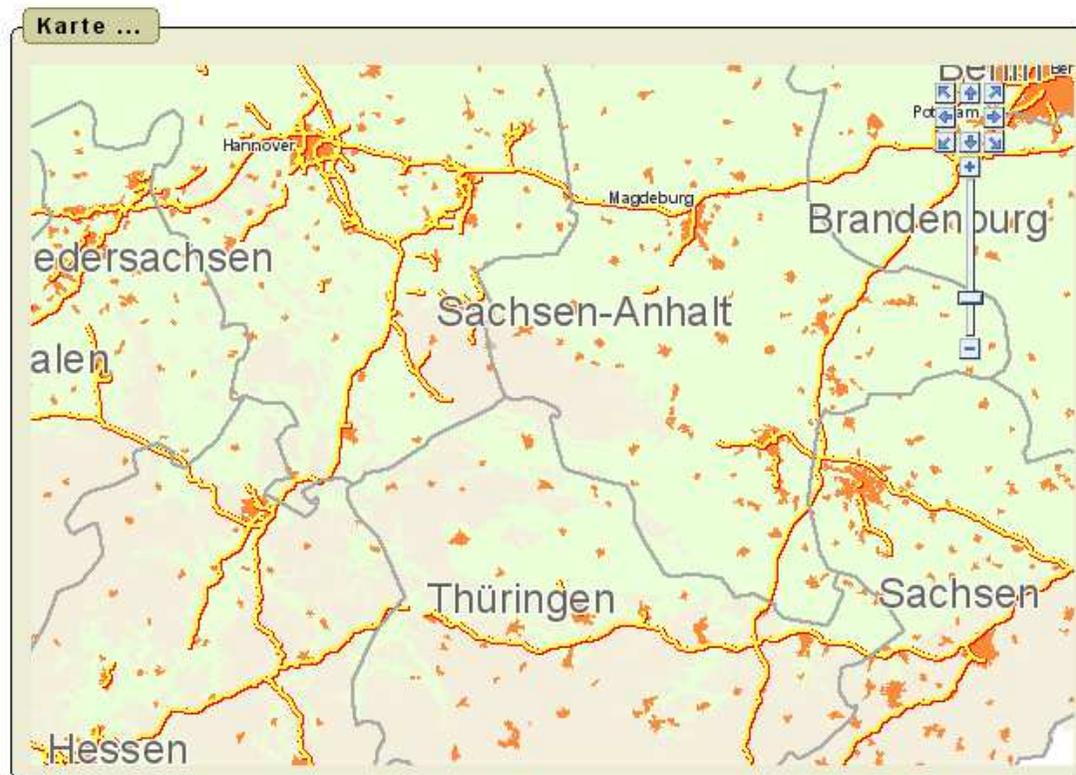
---

Cache storage:   
Specify the root directory for cached image files.

# MAPS weiter denken: WMS

## Das Ergebnis

- Kacheln werden vom WMS-Server abgerufen und im Map Cache abgelegt ...





**Q U E S T I O N S**  
**A N S W E R S**