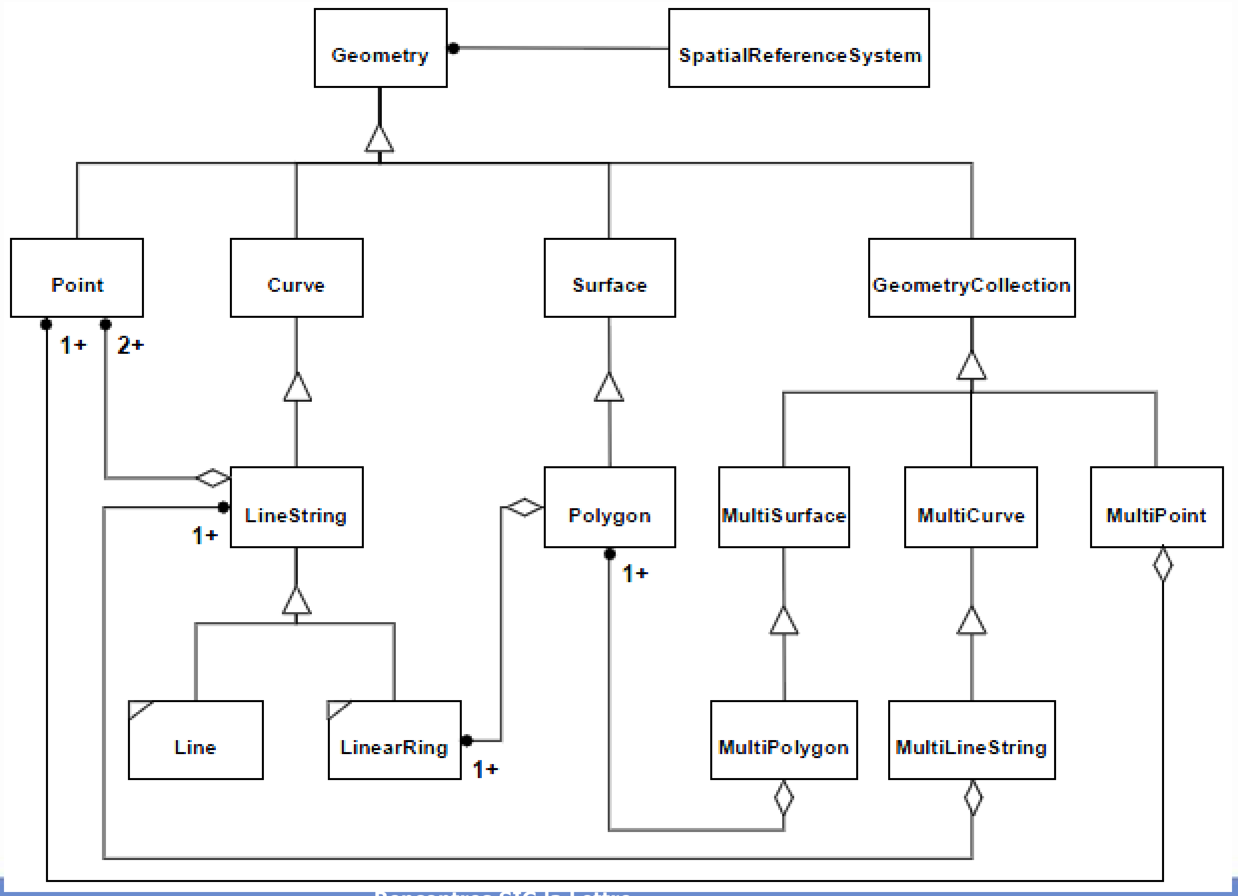
Comparatif des bases de données spatiales

Plan

- Introduction
- Normes spatiales
- Présentation des bases
- Couverture fonctionnelle
- Matrice de comparaison
- Forces et faiblesses
- Conclusion

Normes OGC, ISO

- ISO SQL/MM (ISO/IEC 13249-3 SQL/MM Part 3)
- SFS for SQL
- Modèle objet commun



Normes OGC, ISO: convergence

	SQL with geometry type	ISO/IEC 13249-3:2003 (SQL/MM-Spatial)	Description
Geometry Types	Point Curve Linestring Surface Polygon PolyhedralSurface GeomCollection Multipoint Multicurve Multilinestring Multisurface Multipolygon	ST_Point ST_Curve ST_Linestring ST_Circularstring ST_CompoundCurve ST_Surface ST_CurvePolygon ST_Polygon ST_PolyhedralSurface ST_Collection ST_Multipoint ST_MultiCurve ST_Multilinestring ST_Multisurface ST_Multipolygon	The type ST_PolyhedralSurface is currently not in SQL/MM but will be proposed as a result of this document.
Storage	Binary Type, Text Type, Object Type	Object Type	—
Operations	Equals Disjoint Touches Within Overlaps Crosses Intersects Contains Relate	ST_Equals ST_Disjoint ST_Touches ST_Within ST_Overlaps ST_Crosses ST_Intersects ST_Contains ST_Relate	—
Functions:	—	—	—
Point	 X() Y() Z() M() —	ST_Point() ST_X() ST_Y() ST_Z() ST_M() ST_ExplicitPoint()	Return the Point Return the *X*-coordinate of point Return the *Y*-coordinate of point Return the *Z*-coordinate of point Return the *M*-coordinate of point —

Normes OGC, ISO: limitaion

- Nommage différent:
  - st_buffer sdo_buffer
- Spécificités des bases: LIMIT vs ROWNUM
- ...

PostGIS
Spatial PostgreSQL

ORACLE
SPATIAL

```
select * from departements
where st_intersects (
geometry,
geomfromtext('POLYGON ((
        604009 6401395,
        604009 6561504,
        815492 6561504,
        815492 6401395,
        604009 6401395
    ))', -1)) = 'TRUE';
```

```
select * from departements
  where
  sdo_anyinteract( geometry,
  sdo_geometry('POLYGON ((
        604009 6401395,
        604009 6561504,
        815492 6561504,
        815492 6401395,
        604009 6401395
    ))', -1)) = 'TRUE';
```

Normes OGC, ISO: intérêt

Configuration:

```
... org.hibernatespatial.postgis.PostgisDialect ...
... org.hibernatespatial.postgis.Oracle10gDialect ...
... org.hibernatespatial.postgis.MySQLDialect ...
```

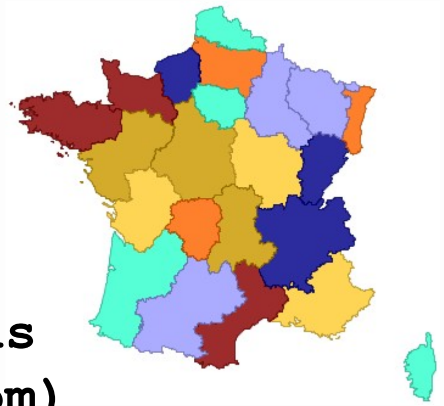
Une classe portant une géométrie:

```
public Class GeoClass { ... private Geometry
 geometry; ...}
```

Une requête spatiale:

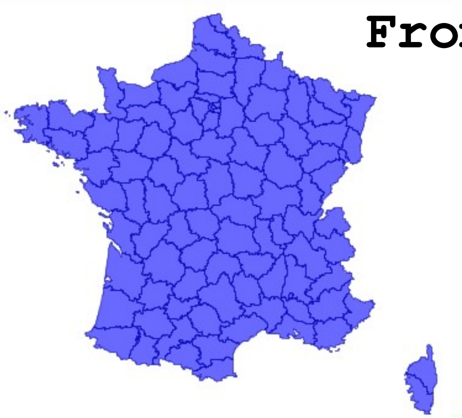
```
Geometry filter = wktReader.read(wktGeom);
Criteria testCriteria =
 session.createCriteria(GeoClass.class);
testCriteria.add(
 SpatialRestrictions.within("geometry", filter));
List results = testCriteria.list();
```

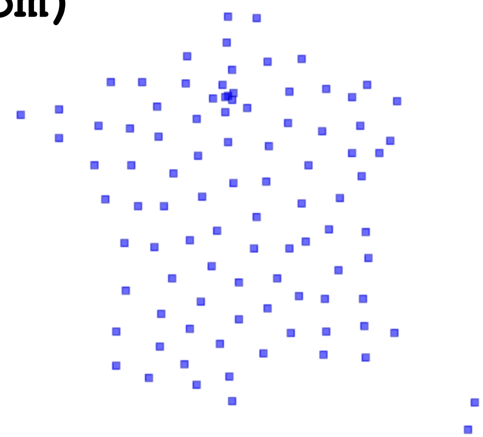
…



```
Create view regions as
select st_union(d.geom)
From departements d
group by code_reg
```

```
select st_centroid(d.geom)
From departements
```

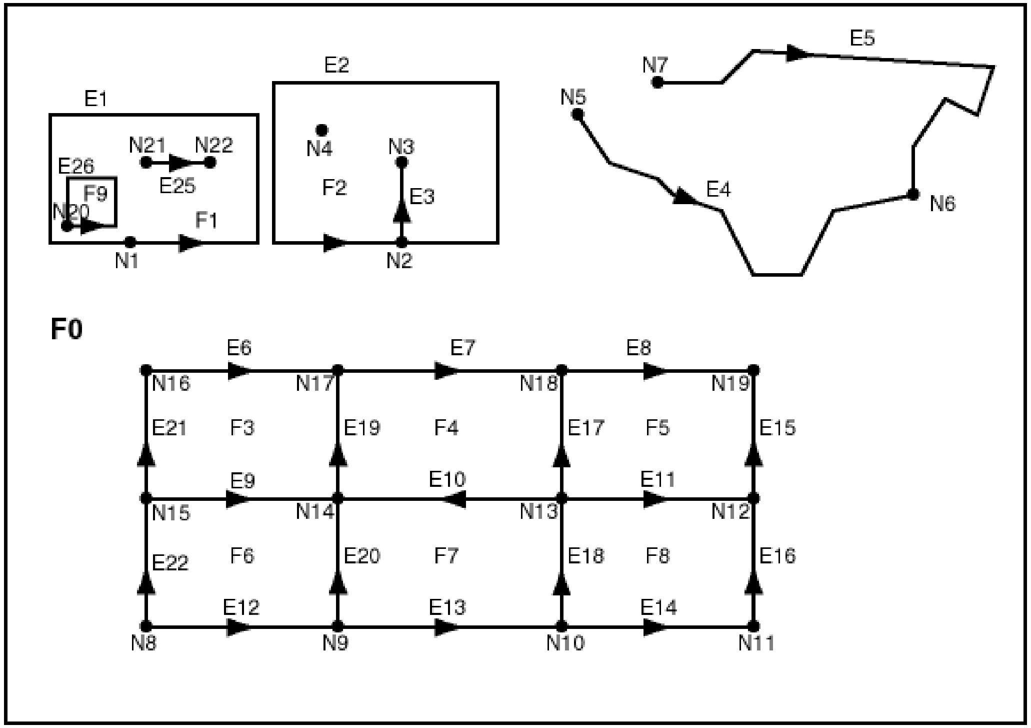




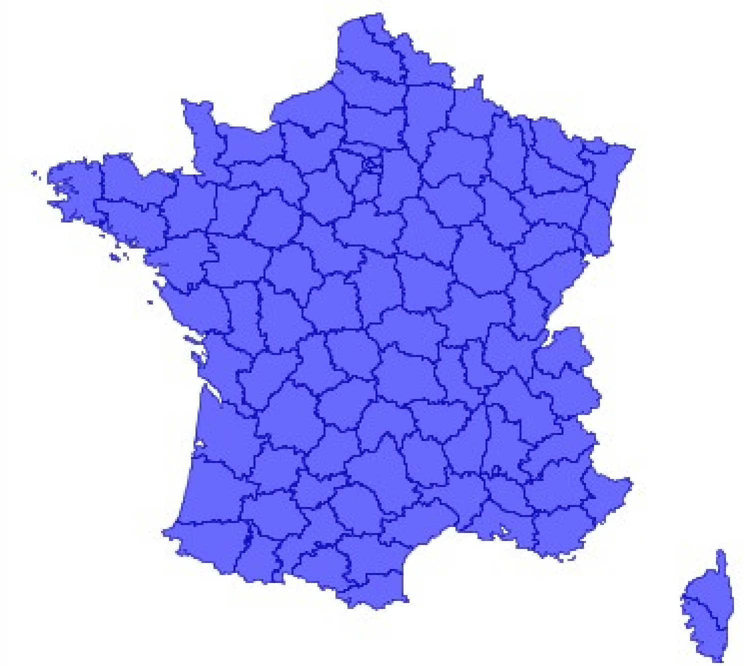
magellium

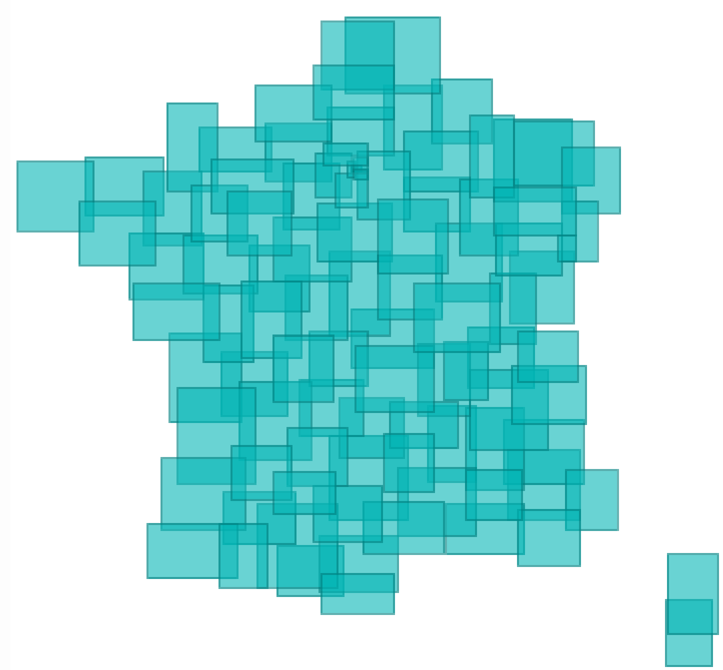
ORACLE DATABASE 11g ORACLE SPATIAL

- ☺ Très riche fonctionnellement
- ☺ Cartouche mature
- ☺ Modules métier: 3D, Network/Topology, Rasters, SRS
- ☹ Chère
- ☹ Lourde



- ☺ Très utilisée pour le web,
- ☺ Rapide pour certaines opérations,
- ☺ support transactionnel (depuis 5.5)
- ☹ Fonctions limitées
- ☹ Pas de loader





- Since 1986/2000…
- 2 entités différentes
- ☺ Communauté très active (développement, support)
- ☺ Nombreuses fonctions (200+)
- ☺ Nouveautés 1.5:
  - Geography ☺
  - Robustesse, Vitesse

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PostGIS

Spatial PostgreSQL

- Since 1986/2000…
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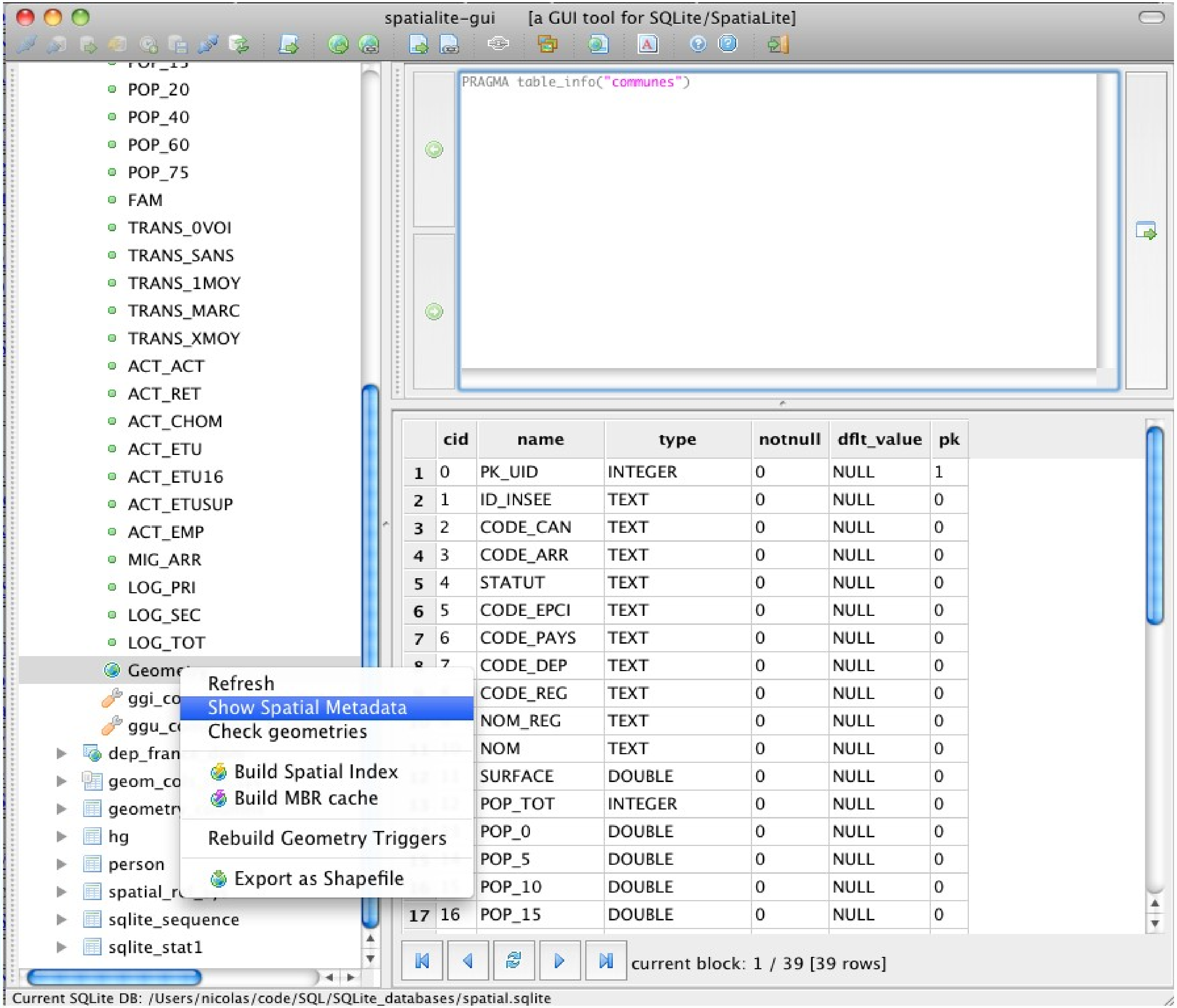
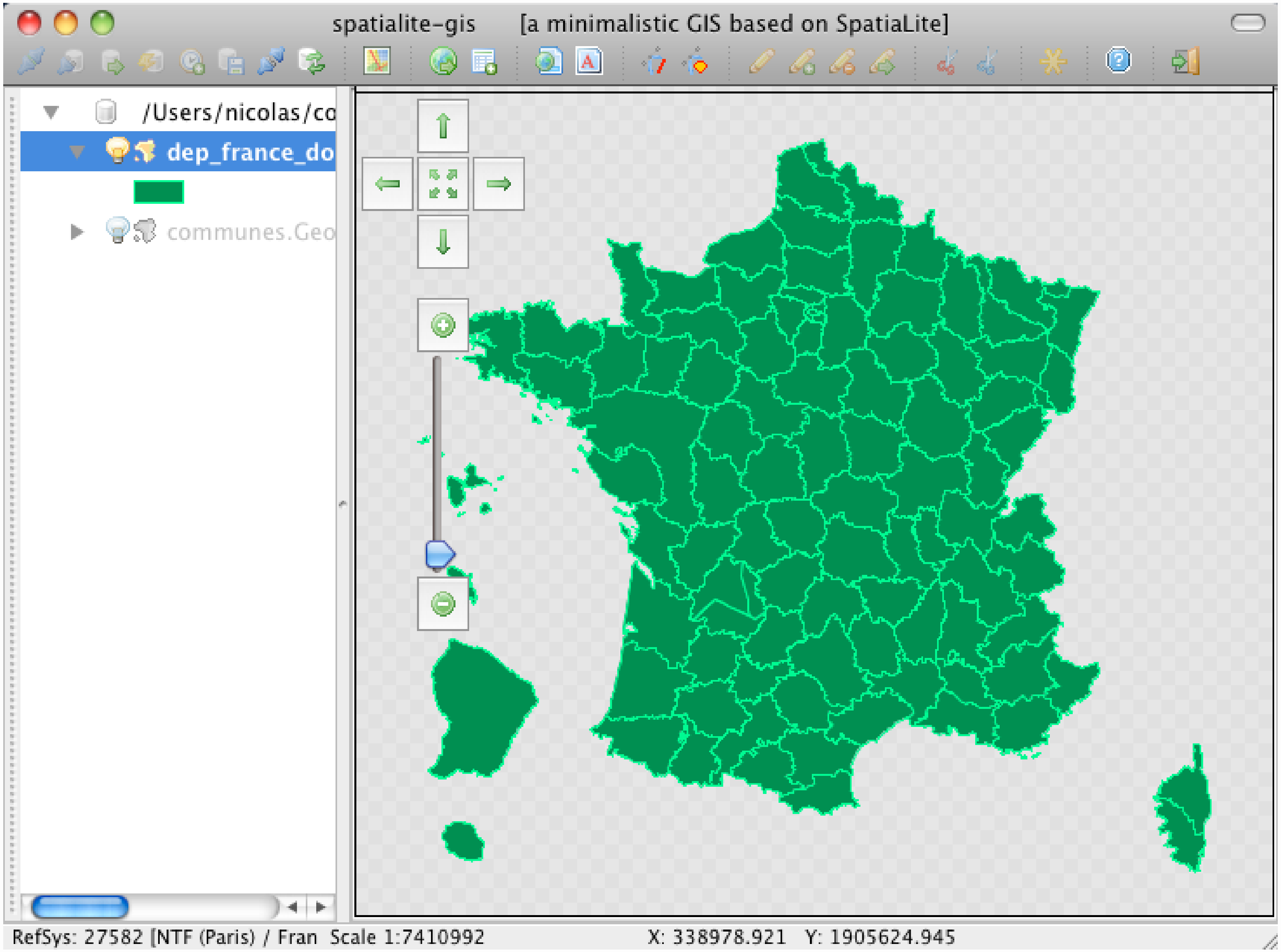
  - Robustesse, Vitesse

- 500 000 000 !
- ☺ 253 Ko/294 Ko !
- ☺ Support GeoTools
- GUI
- Pas une BD client/serveur
- ☹ Accès java limité
- ☹ Confidentiel



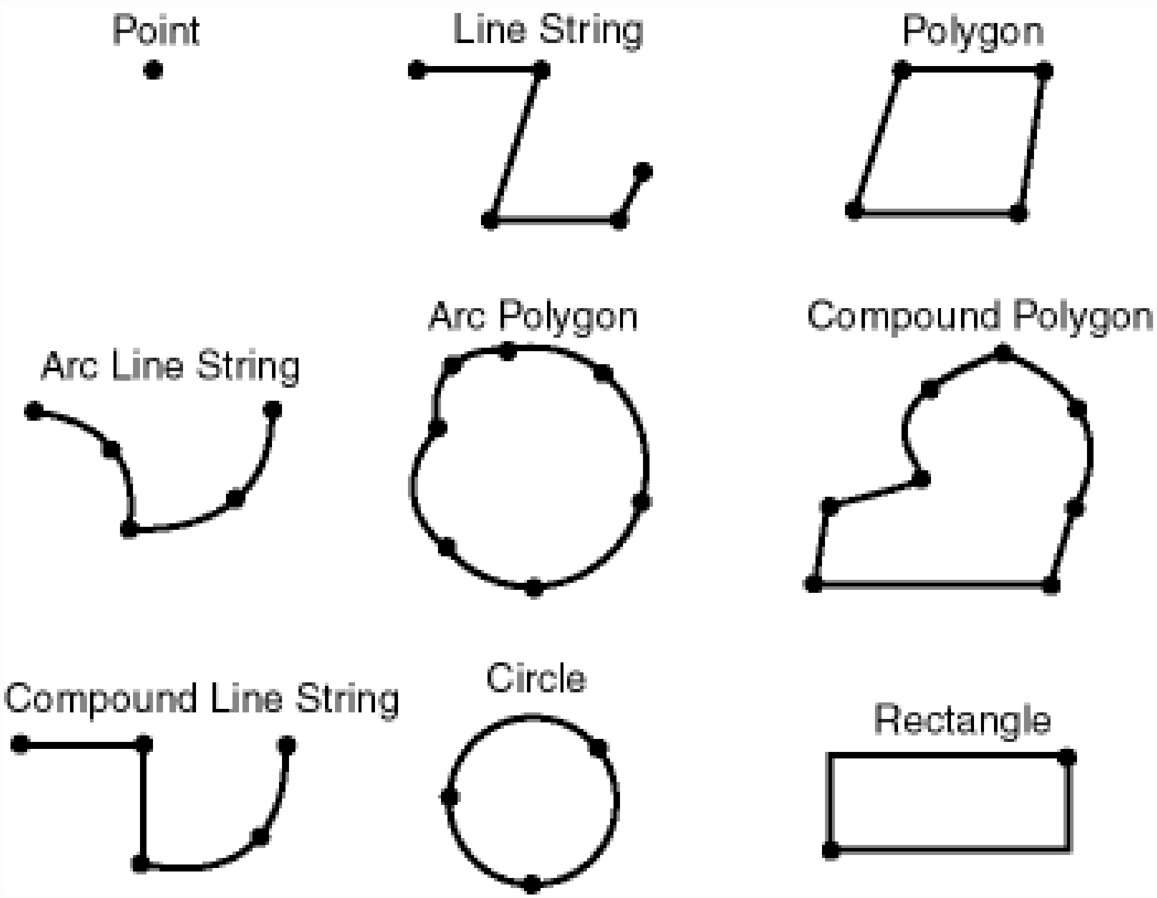
spatialite-gui [a GUI tool for SQLite/SpatiaLite]
POP_20
POP_40
POP_60
POP_75
FAM
TRANS_0VOI
TRANS_SANS
TRANS_1MOY
TRANS_MARC
TRANS_XMOY
ACT_ACT
ACT_RET
ACT_CHOM
ACT_ETU
ACT_ETU16
ACT_ETUSUP
ACT_EMP
MIG_ARR
LOG_PRI
LOG_SEC
LOG_TOT
Refresh
Show Spatial Metadata
Check geometries
Build Spatial Index
Build MBR cache
Rebuild Geometry Triggers
Export as Shapefile
hg
person
sqlite_sequence
sqlite_stat1
PRAGMA table_info("communes")
cid name type notnull dflt_value pk
1 0 PK_UID INTEGER 0 NULL 1
2 1 ID_INSEE TEXT 0 NULL 0
3 2 CODE_CAN TEXT 0 NULL 0
4 3 CODE_ARR TEXT 0 NULL 0
5 4 STATUT TEXT 0 NULL 0
6 5 CODE_EPCI TEXT 0 NULL 0
7 6 CODE_PAYS TEXT 0 NULL 0
CODE_DEP TEXT 0 NULL 0
CODE_REG TEXT 0 NULL 0
NOM_REG TEXT 0 NULL 0
NOM TEXT 0 NULL 0
SURFACE DOUBLE 0 NULL 0
POP_TOT INTEGER 0 NULL 0
POP_0 DOUBLE 0 NULL 0
POP_5 DOUBLE 0 NULL 0
POP_10 DOUBLE 0 NULL 0
17 16 POP_15 DOUBLE 0 NULL 0
current block: 1 / 39 [39 rows]
Current SQLite DB: /Users/nicolas/code/SQL/SQLite_databases/spatial.sqlite


spatialite-gis [a minimalistic GIS based on SpatiaLite]
/Users/nicolas/co
dep_france_do
communes.Geo
RefSys: 27582 [NTF (Paris) / Fran Scale 1:7410992
X: 338978.921 Y: 1905624.945

Critères de comparaison

- Objets supportés
- Modules métier
- Chargement de données
- Support des normes
- Accès externes

Types géographiques



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POINT/LINESTRING/POLYGON/MULTI* Arc Linestring, Arc Polygon, Compound Polygon, Compound Linestring, Circle, Rectangle	ORACLE DATABASE 11g
POINT/LINESTRING/POLYGON/MULTI* CIRCULARSTRING, COMPOUNDCURVE, CURVEPOLYGON (PG 1.4+)	PostGIS Spatial PostgreSQL
POINT/LINESTRING/POLYGON/MULTI*	
POINT/LINESTRING/POLYGON/MULTI*	MySQL

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Modules métier

ORACLE DATABASE 11g	PostGIS Spatial PostgreSQL		MySQL
Topologie GeoCodage SRS Réf. Linéaire Data Mining Géographie Rasters	*SRS* Réf Linéaire Géographie *Rasters* *Topologie*	*SRS*	

Chargement des données

ORACLE DATABASE 11g	PostGIS Spatial PostgreSQL		MySQL
Java Shapefile Converter (buggé) SQL*Loader (texte)	Shp2pgsql Pgsql2shp CSV/TXT Loader	Shapefile Loader CSV/TXT Loader	

GDAL

Support des normes

ORACLE DATABASE 11g	PostGIS Spatial PostgreSQL		MySQL
SFS 1.1 *SQL/MM*	**SFS 1.1** *SQL/MM*	SFS 1.1	*SFS 1.1*

Licence

Oracle Database 11g	PostGIS		MySQL
Commercial (12556 € / proc + 2762 € par an)	GNU GPL	Mozilla Public et GPLv3	GPL + Commercial

Accès externes

Nombreux logiciels SIG, ArcGIS, ArcSDE MapInfo, FME, Autodesk, MapServer (natif) OGR, GeoTools, uDig ...
Nombreux logiciels SIG Open Source, uDig, GRASS, Jump, QGis, MapServer (natif), OGR, GeoTools ArcGIS, FME...
Qgis, OGR, Spatialite GIS, MapServer
Jump, OGR, FME

Conclusion

- Oracle, MySQL, PostGIS, Spatialite, … ?
- Utiliser une BD Spatiale !