

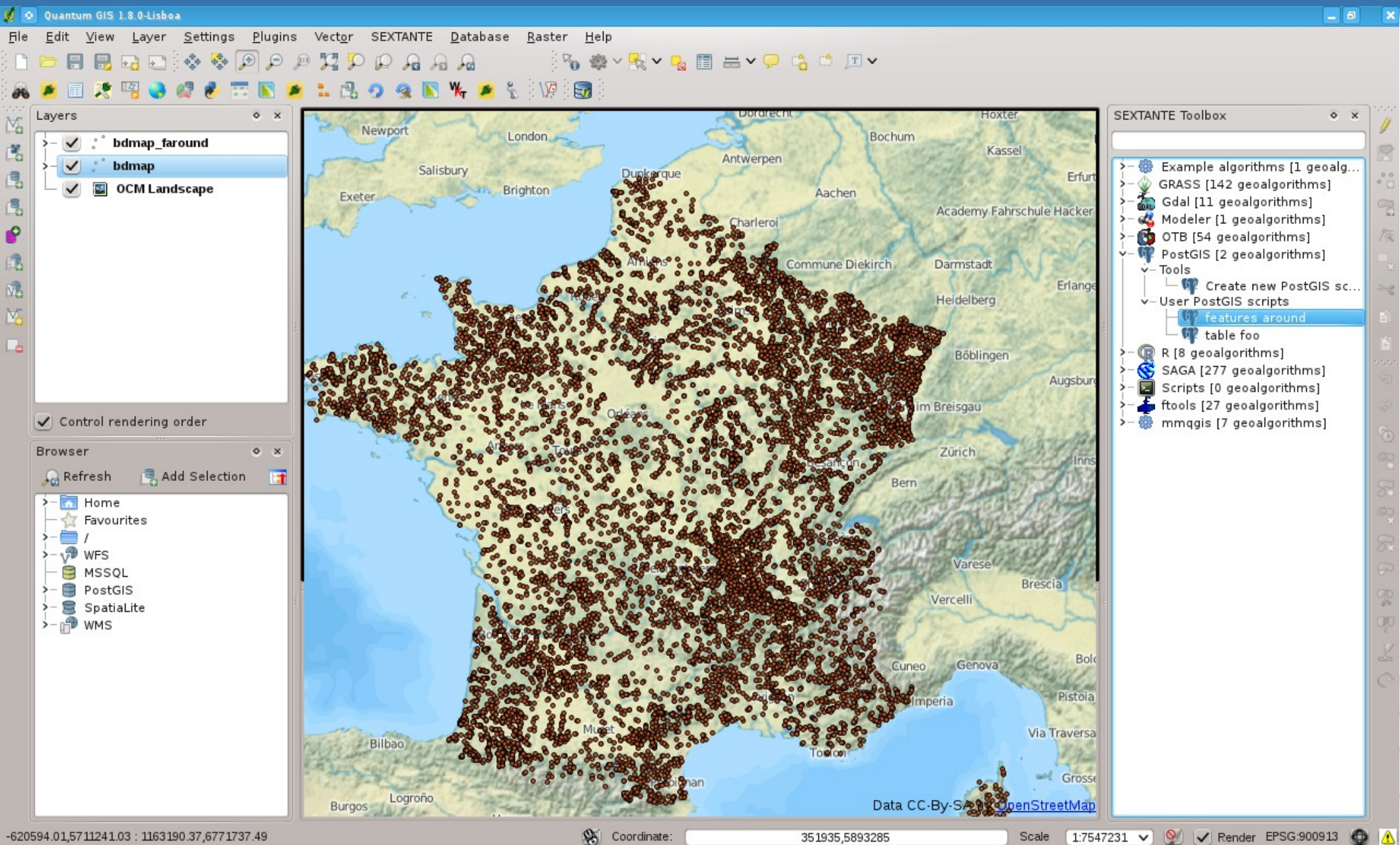


## **Efficiently using PostGIS with QGIS**

**Vincent Picavet – Oslandia**



# Quantum GIS



-620594.01,5711241.03 : 1163190.37,6771737.49

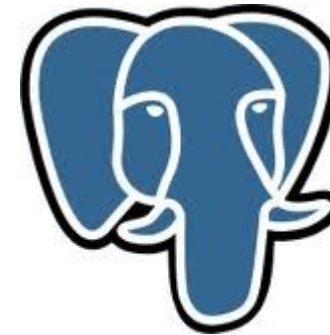
# Quantum GIS

- FOSS Desktop GIS
- 2002 Gary Sherman, PostGIS viewer
- 2004 OSGeo project
- 2009 Version 1.0
- 2011 1.7.0
- 2012 1.8.0
- GIS platform to view, edit, analyze
  - Python plugins
  - Custom applications





# PostGIS



- FOSS Spatial database
  - PostgreSQL addon
- 2001 Refrations Research
- 2006 Version 1.0
- 2011 Version 1.5.3
- OGC SFS, SQL/MM
- 2012 Version 2.0
  - Raster support
  - Topology



# Quantum GIS PostGIS support

- Native support
  - Load tables & views
  - Edit and update
  - Offline editing
- 3d-party plugins
  - Dynamic querying
  - Versionning
  - Database management
  - Raster in db



# QGIS Native support



# Native support : open

The screenshot displays the Quantum GIS desktop environment. The main map window shows a street map with a red polygon highlighting a specific area. Overlaid on this are two dialog boxes:

**Ajouter une ou plusieurs tables PostGIS**

This dialog is used to connect to a PostgreSQL database. The 'Connexions' dropdown is set to 'paris'. Below the connection buttons, a table lists available databases and their tables:

Schéma	Table	Type	Colonne géométrique
public	eau	POINT	the_geom
public	eau		
public	geography_columns		
public	geometry_columns		
public	jardin	MULTIPOLYGON	the_geom
public	jardin		
public	nbati	MULTIPOLYGON	the_geom
public	nbati		
public	spatial_ref_sys		
public	stationnement	POINT	the_geom
public	stationnement		
public	trottoir	MULTILINESTRING	the_geom
public	trottoir		
public	vol_bati	MULTIPOLYGON	the_geom
public	vol_bati		

At the bottom of this dialog, there are checkboxes for 'Lister les tables sans géométries' and 'Options de recherche', along with search fields and buttons like 'Ajouter', 'Construire une requête', and 'Fermer'.

**Constructeur de requête**

This window is used to build SQL queries. It features two main panels: 'Champs' (Fields) and 'Valeurs' (Values).

The 'Champs' panel lists available fields for the 'jardin' table:

- acces
- risque
- date\_maj
- validite
- sairejeux
- nairejeux
- n\_jeux
- l\_voie
- l\_riviere
- l\_soutnmt
- n\_arbre
- n\_banc
- n\_candel

The 'Valeurs' panel shows a list of values for the selected field 'n\_jeux':

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Below these panels are sections for 'Opérateurs' (Operators) and 'Clause SQL WHERE'. The 'Opérateurs' section contains buttons for various comparison and logical operators. The 'Clause SQL WHERE' section contains a text input field with the query: "n\_jeux" = '0'.

At the bottom of the 'Constructeur de requête' window are buttons for 'Aide', 'Tester', 'Effacer', 'OK', and 'Annuler'.



# Native support : attributes

Quantum GIS exported - postgis

Fichier Éditer Vue Couche Préférences Extension Raster Base de donnée Aide

Couches

- Fontaines Wallace
- stationnement
- eau
- jardin**
  - Arboretum
  - Décoration
  - Espace Vert
  - Esplanade
  - Jardin
  - Jardin Partagé
  - Jardin d'immeubles

Attributs table - jardin : 0 / 1042 feature(s) selected

	gid	nom	denom	label	anneec
0	735	Clichy-Batigno...	Parc	NULL	2007
1	445	de l'hôpital Sa...	Jardin	NULL	1977
2	894	boulevard de l...	Murs végétali...	NULL	2008
3	895	rue Polonceau	Murs végétali...	NULL	2008
4	913	rue Saint-Sau...	Murs végétali...	NULL	2005
5	914	rue Palestro	Murs végétali...	NULL	2008
6	915	rue des Vertus	Murs végétali...	NULL	2008
7	916	rue des Franc...	Murs végétali...	NULL	2008
8	884	place de la po...	Murs végétali...	NULL	2004
9	917	rue de montm...	Murs végétali...	NULL	2008
10	299	Gaston Baty	Square	NULL	1929
11	57	du quai de Mo...	Square	NULL	1929
12	2	du Vert Galant	Square	NULL	1884
13	1	des halles	Jardin	NULL	1982
14	19	Madeleine Sc...	Jardin	NULL	2004
15	3	de la place Da...	Square	NULL	1970

Chercher pour dans gid Chercher

Afficher sélection Ne rechercher que dans la sélection Sensible à la casse Recherche avancée ?

Édition des données - local (localhost:5432) - paris - jardin

Fichier Édition Affichage Outils Aide

Pas de limite

	gid [PK] serial	nom character v	denom character v	label character v	anneec integer	anneer integer	horaire character v	acces character v
1	1	des halles	Jardin		1982	0	ouv7,30>9,0	métro les
2	2	du Vert Gal	Square		1884	0	ouv7,30>9,0	métro Pont
3	3	de la place	Square		1970	0	ouv7,30>9,0	métro Pont
4	4	de l' Orato	Jardin		1976	0		métro le L
5	5	de la place	Jardin		1976	0		métro le L
6	6	place du li	Jardin		0	0		
7	7	rue du Louv	Jardinière		0	0		
8	8	Louvois	Square		1859	0	ouv7,30>9,0	04_sept
9	9	Jacques Bid	Square		1966	0	ouv7,30>9,0	métro bonr
10	10	Lazareff	Jardin		1937	1995		
11	11	place d'Ale	Jardin		2001	0		
12	12	rue marie s	Jardin		0	0		
13	13	du Temple	Square		1857	0		
14	14	Emile Chaut	Square		1859	0		

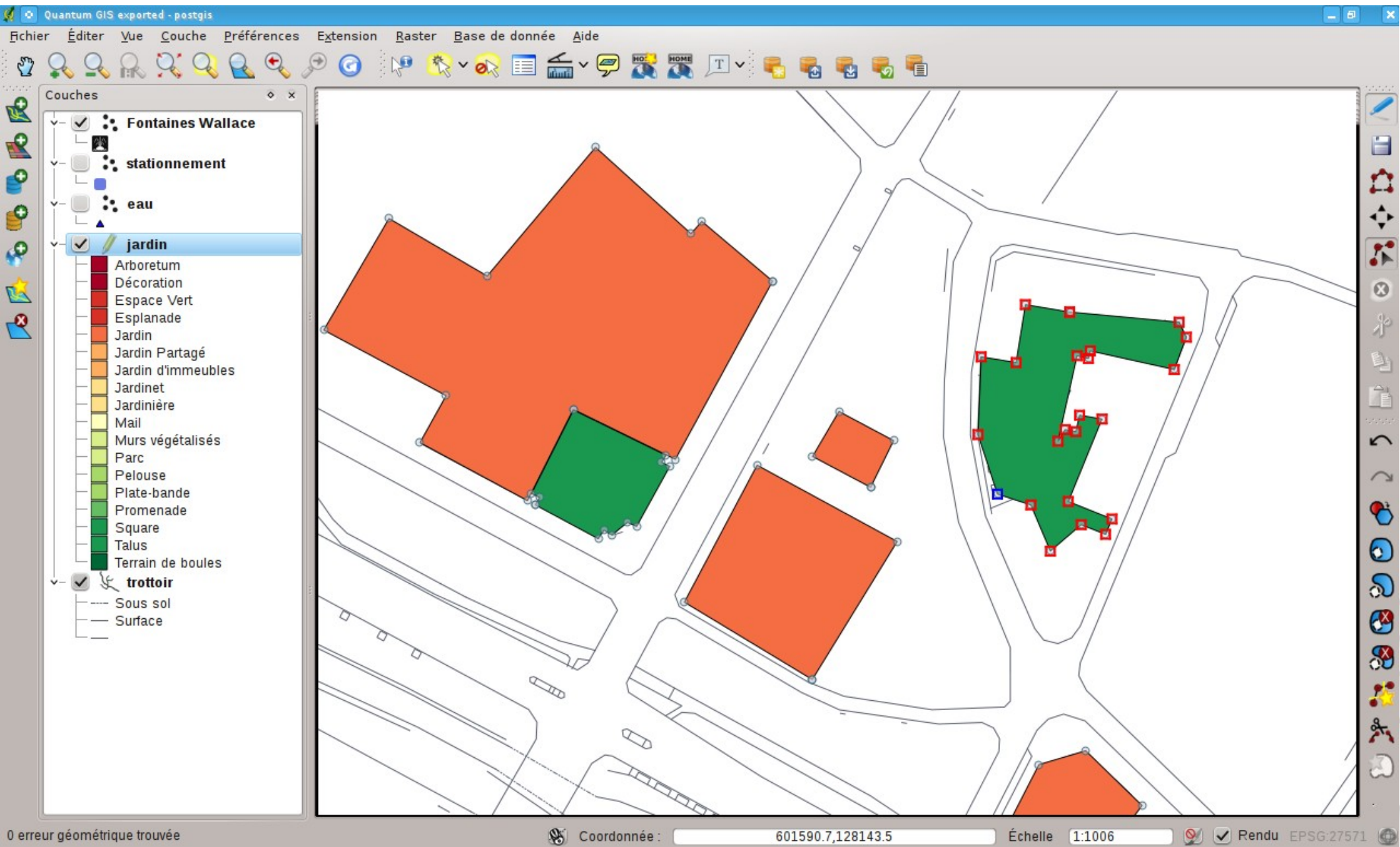
Bloc notes

1042 lignes.

221,127701 Échelle 1:9754 Rendu EPSG:27571



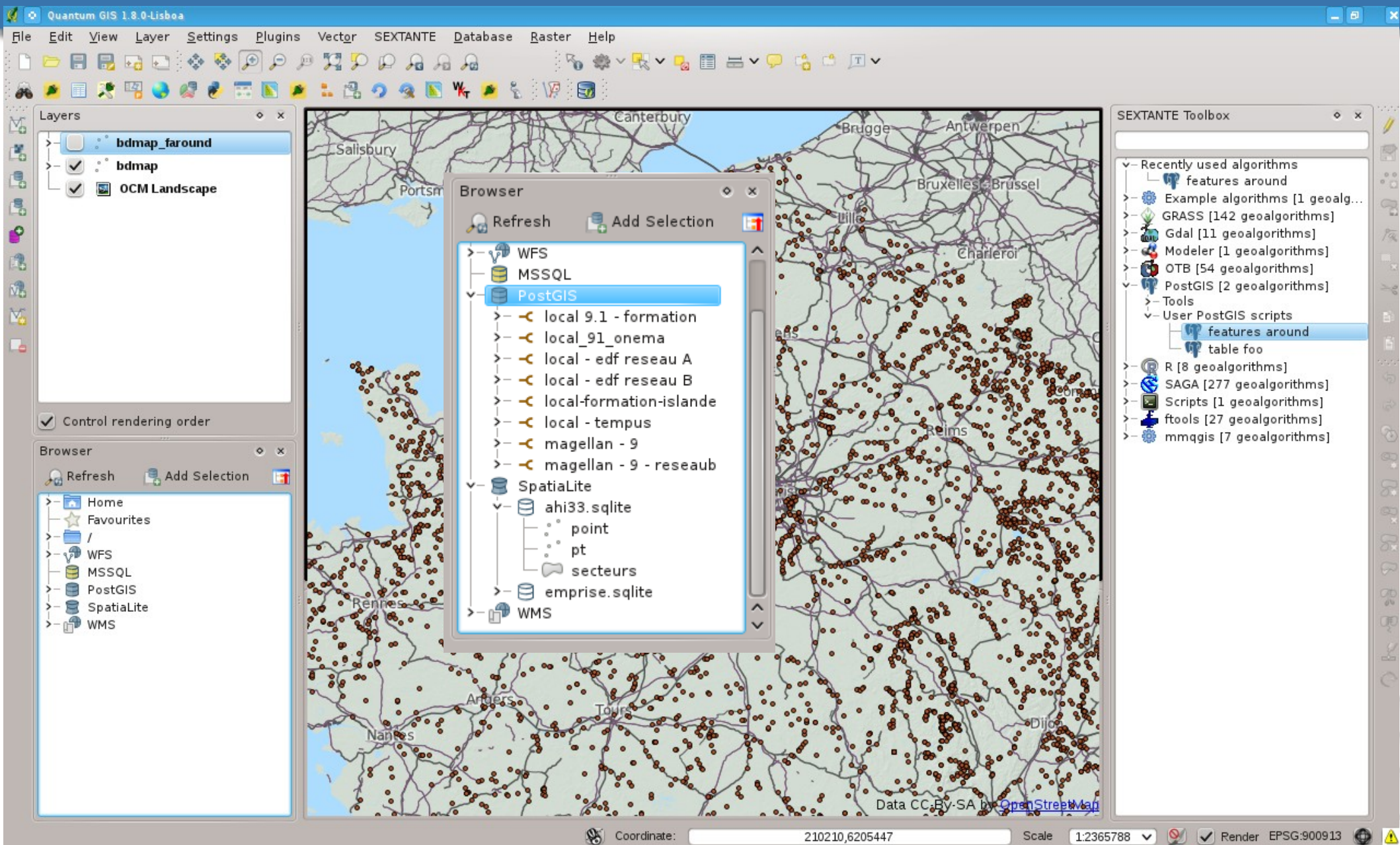
# Native support : edit



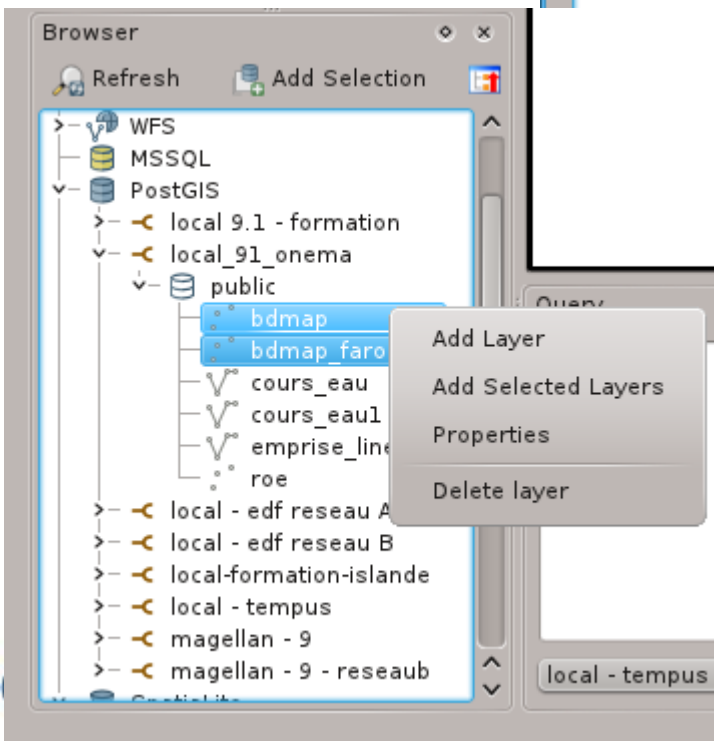
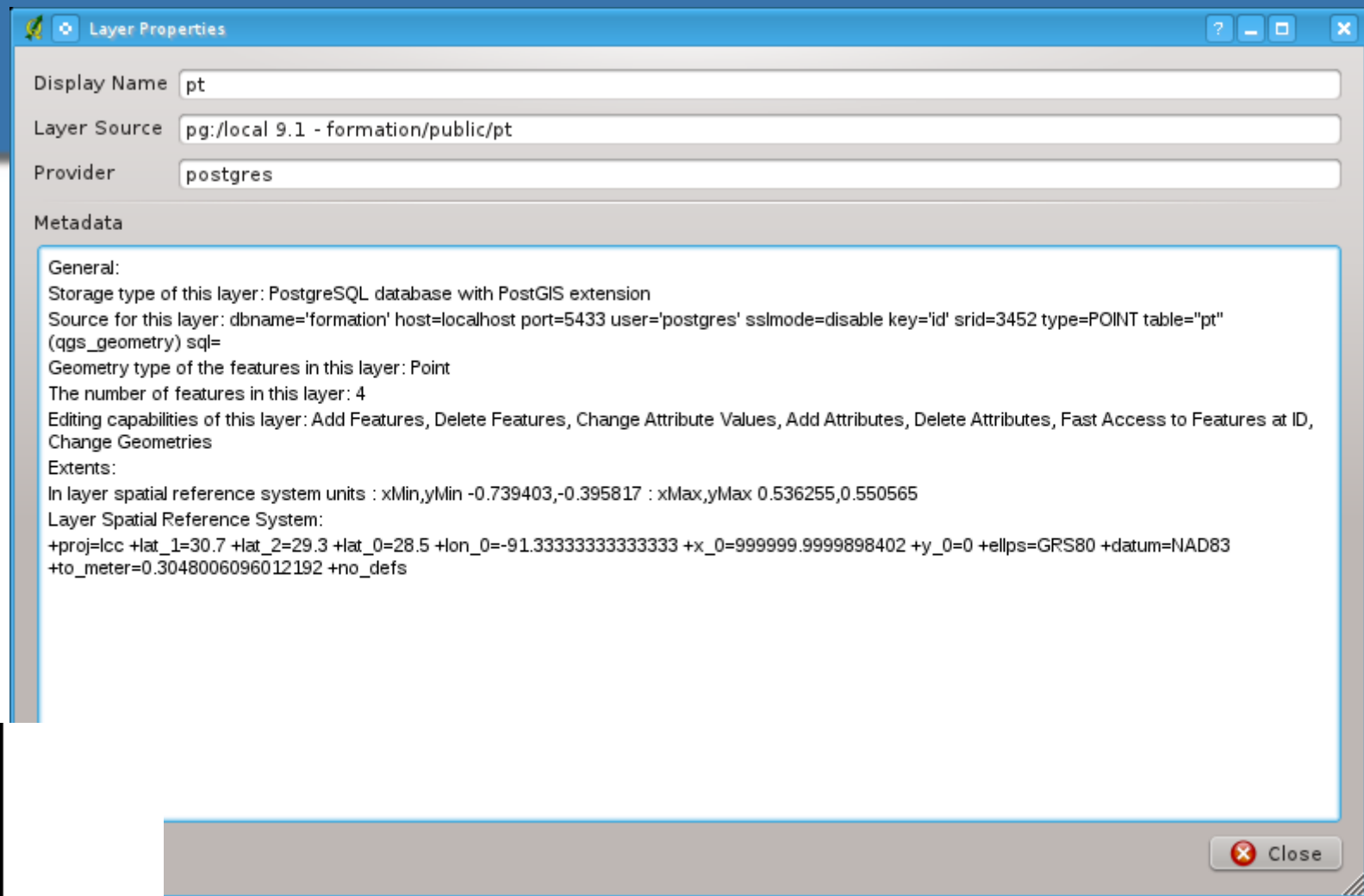
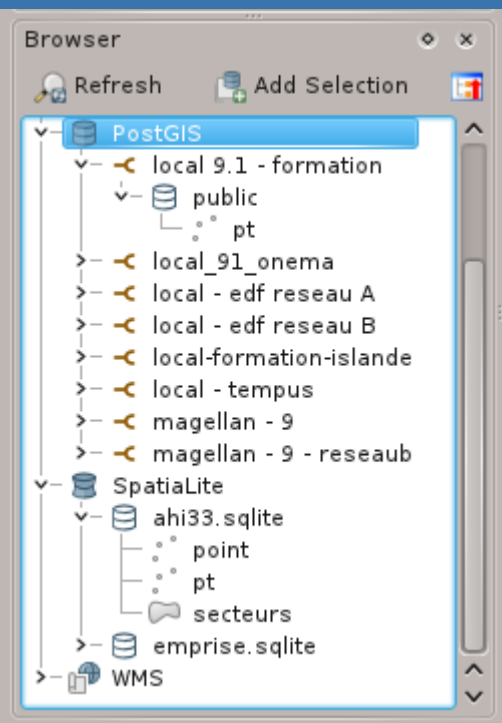
# QGIS Browser



# QGIS Browser





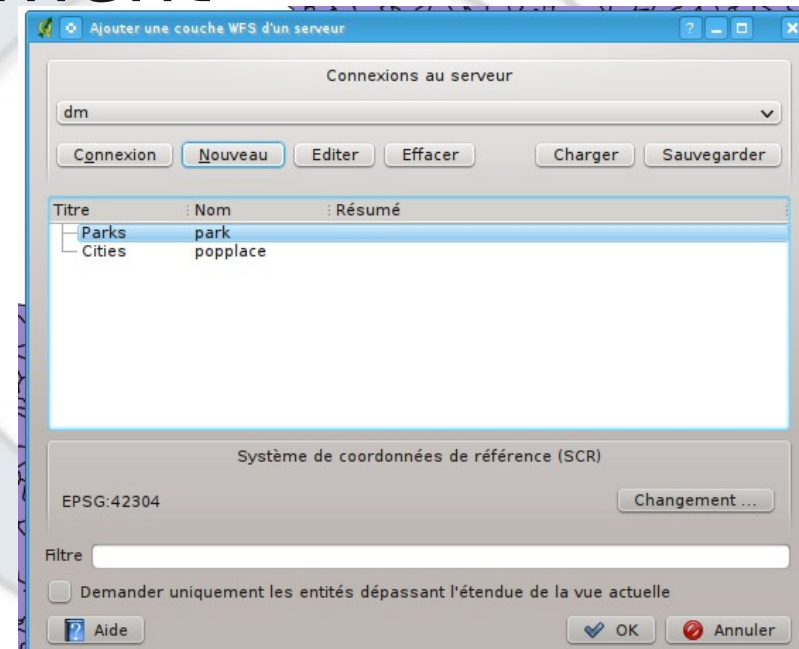


# Using PostGIS through webservices



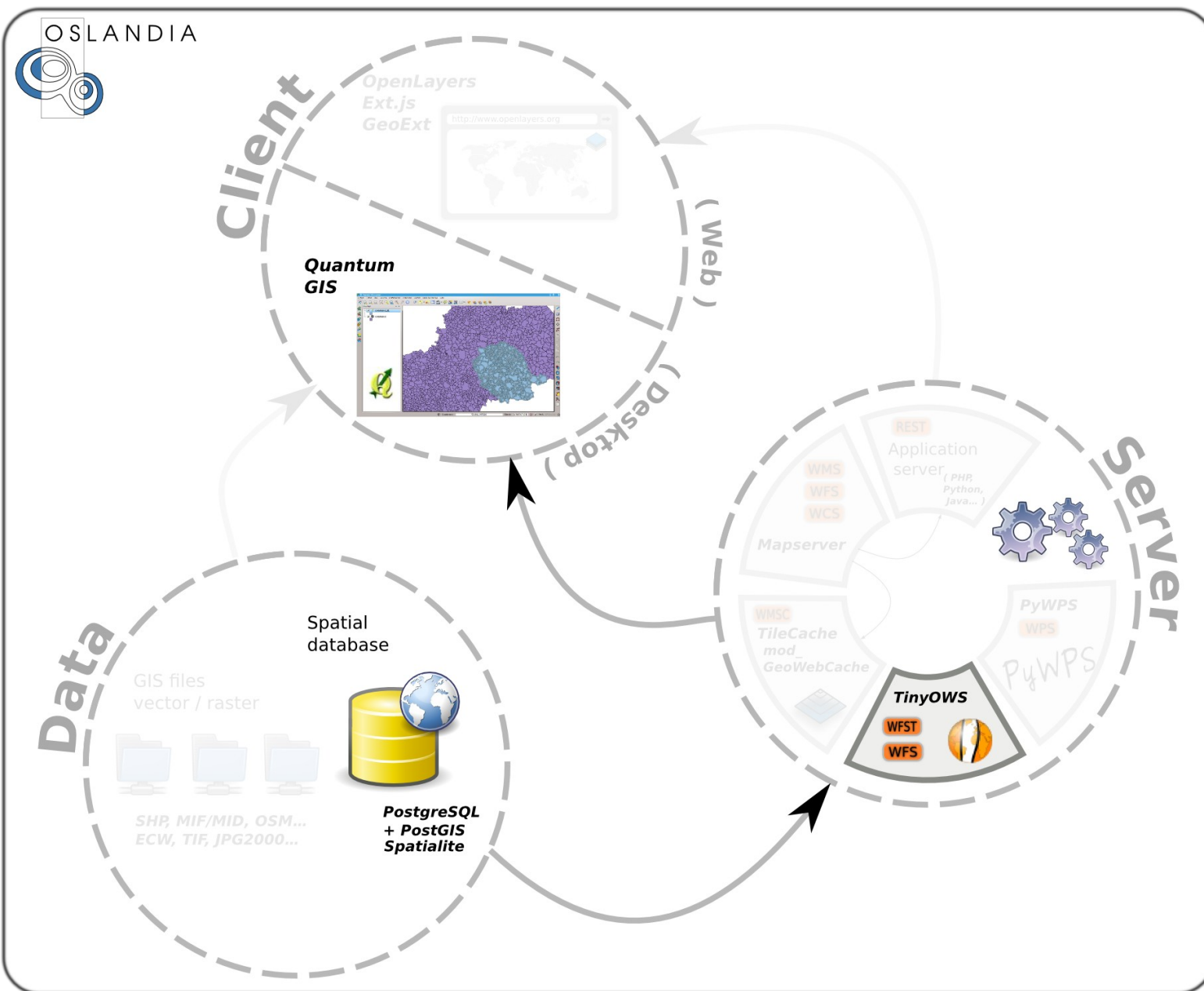
# Native support : WFS-T

- Web Feature Service - Transactional
  - Access to feature level
  - Read and write
  - WFS server needed (TinyOWS, GeoServer)
- HTTP level rights management
- Interoperability
- Web-based infrastructure





# Native support : WFS-T



# Using views



# Native support : load & edit view

- Views = tables
- Edit ← updatable view

```
drop view if exists communes_81;
create view communes_81 as select * from communes where depart = '81';

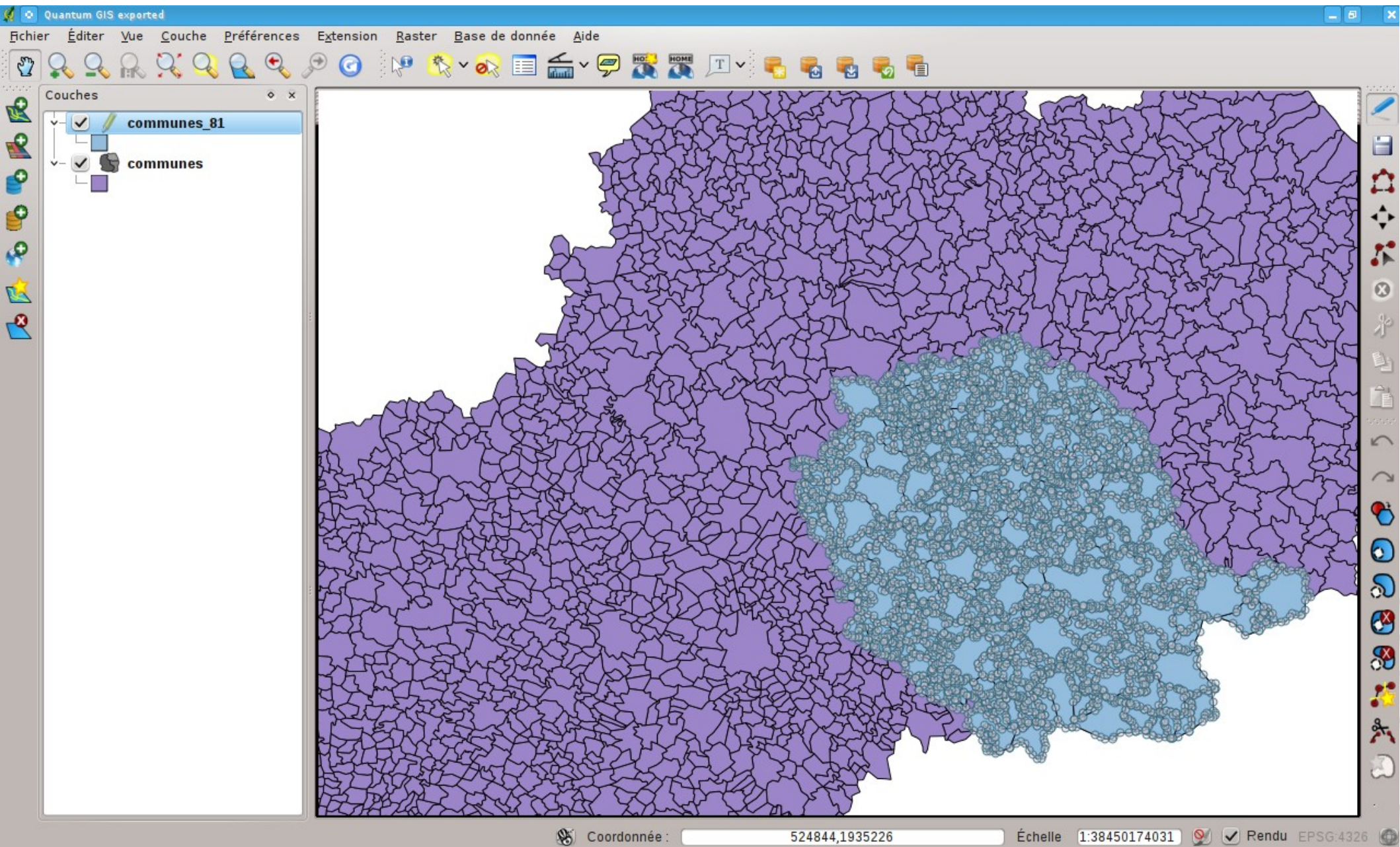
create rule communes_81_ins as
  on insert to communes_81
  do instead
    insert into communes
      values(NEW.gid, NEW.code_insee, NEW.commune, NEW.popsdc, NEW.km2, NEW.canton, NEW.depart, NEW.zrr, NEW.the_geom);

create rule communes_81_upd as
  on update to communes_81
  do instead
    update communes
      set
        gid = NEW.gid, code_insee = NEW.code_insee, commune = NEW.commune,
        popsd = NEW.popsdc, km2 = NEW.km2, canton = NEW.canton, depart = NEW.depart, zrr = NEW.zrr, the_geom = NEW.the_geom
      where gid = OLD.gid;

create rule communes_81_del as
  on delete to communes_81
  do instead
    delete from communes where gid = OLD.gid;
```



# Native support : load & edit view



# Native support : updatable views

- Use PostgreSQL rights
  - Manage roles
  - Avoid conflicts
- No need for middle-tier software
- View creation can be automated
  - PL/pgSQL

# DB Manager





# DB Manager plugin

The screenshot displays the DB Manager plugin interface. On the left, a tree view shows the database structure, with 'PostGIS' expanded to show 'public' schema, which includes 'bdmap' and 'bdmap\_faround'. The 'bdmap\_faround' table is selected. The main panel shows the 'Info' tab for this table.

**Database:** PostGIS  
**Schema:** public  
**Table:** bdmap\_faround

**General info**

Relation type: Table  
Owner: postgres  
Pages: 17  
Rows (estimation): 535  
Rows (counted): Unknown ([find out](#))  
Privileges: select, insert, update, delete

**PostGIS**

Column: the\_geom  
Geometry: POINT  
Dimension: 2  
Spatial ref: RGF93 / Lambert-93 (2154)  
Estimated extent: 465740.06250, 6748659.00000 - 663026.25000, 6943964.00000  
Extent: (unknown) ([find out](#))

**Fields**

#	Name	Type	Length	Null	Default
1	gid	int4	4	Y	
2	sg_id	numeric (10,0)		Y	
3	st_codecsp	varchar (259)		Y	
4	nom_statio	varchar (259)		Y	
5	source	varchar (259)		Y	
6	bien_proje	varchar (259)		Y	
7	id_bdcarth	numeric		Y	
8	id_bdcar_1	varchar (259)		Y	
9	nom_cours_	varchar (259)		Y	
10	insee_comm	varchar (259)		Y	
11	nom_commun	varchar (259)		Y	
12	date_maj	varchar (259)		Y	

**Warnings:**

- No primary key defined for this table!
- No spatial index defined ([create it](#))

# DB Manager plugin

DB Manager

Database Schema Table

Refresh SQL window

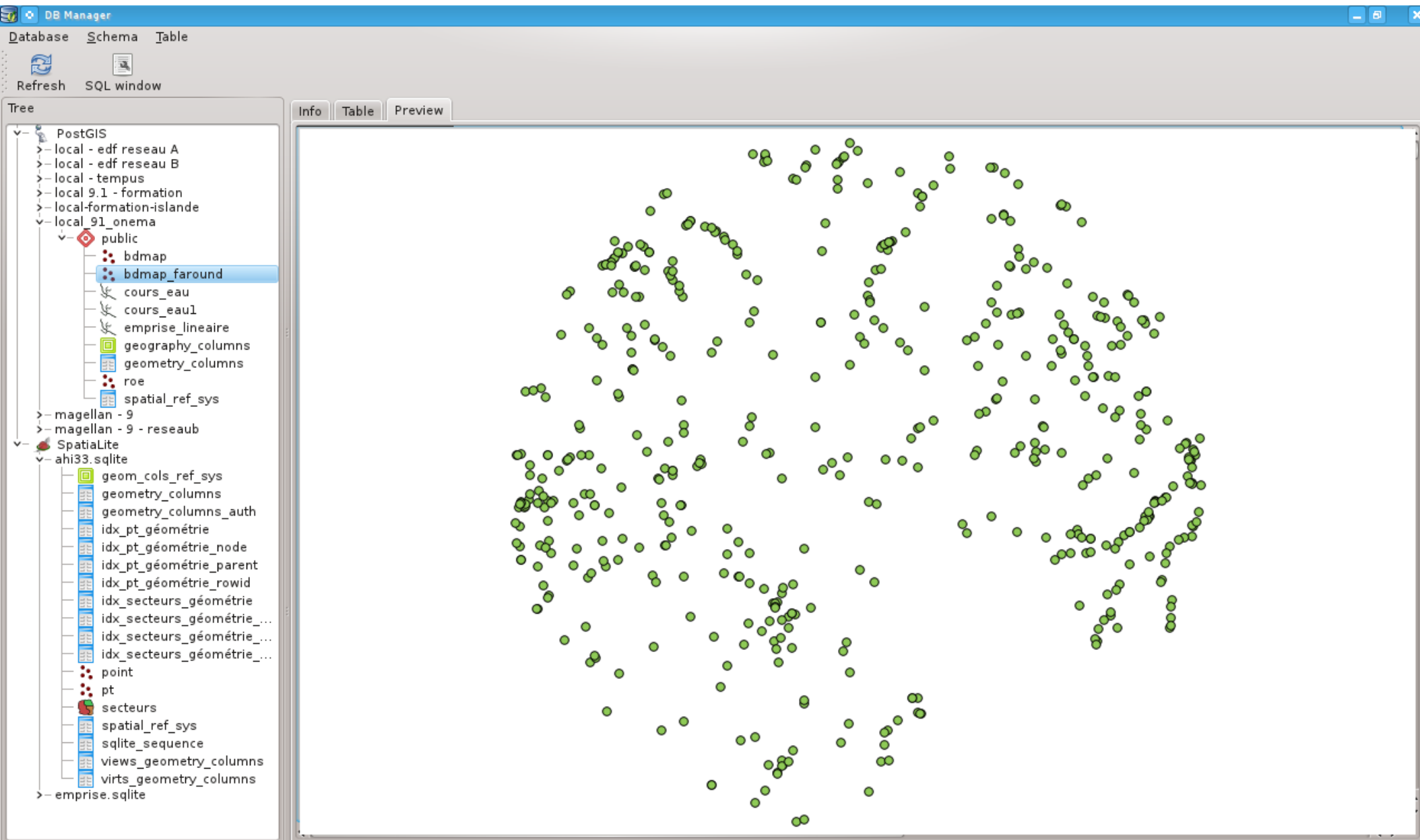
Tree

- PostGIS
  - local - edf reseau A
  - local - edf reseau B
  - local - tempus
  - local 9.1 - formation
  - local-formation-islande
  - local 91\_onema
    - public
      - bdmap
      - bdmap\_faround
      - cours\_eau
      - cours\_eau1
      - emprise\_lineaire
      - geography\_columns
      - geometry\_columns
      - roe
      - spatial\_ref\_sys
  - magellan - 9
  - magellan - 9 - reseaub
- SpatialLite
  - ahi33.sqlite
    - geom\_cols\_ref\_sys
    - geometry\_columns
    - geometry\_columns\_auth
    - idx\_pt\_géométrie
    - idx\_pt\_géométrie\_node
    - idx\_pt\_géométrie\_parent
    - idx\_pt\_géométrie\_rowid
    - idx\_secteurs\_géométrie
    - idx\_secteurs\_géométrie...
    - idx\_secteurs\_géométrie...
    - idx\_secteurs\_géométrie...
    - point
    - pt
    - secteurs
    - spatial\_ref\_sys
    - sqlite\_sequence
    - views\_geometry\_columns
    - virt\_geometry\_columns
  - emprise.sqlite

Info Table Preview

	gid	sg_id	st_codeesp	nom_statio	source	bien_proje	id_bdcarth	id_bdcar_1	nom_cours	insee_c
1	3687	4817	03270029	Riviere l' Eure à Gadencourt //...	LN ok	t	300011330.00...	H4--0200	rivière l'eure	27326
2	3812	5382	03780025	Fleuve la Seine à Conflans-sa...	LN ok	t	300011573.00...	----0010	fleuve la seine	78172
3	3834	5379	03780036	La Seine à Triel Sur Seine // IL...	LN ok	t	300011809.00...	----0010	fleuve la seine	78624
4	5178	11085	03140107	L'Ante à Morteaux-coul...	BDMAP - autres	f	300012435.00...	I1210600	rivière l'ante	14452
5	5921	3200	03950044	Riviere l' Aubette à Con...	LN ok	t	300010669.00...	H3010600	rivière l'aubette	95170
6	5922	3201	03950008	Riviere l' Aubette à Sag...	LN ok	t	300010395.00...	H3010600	rivière l'aubette	95535
7	6101	3954	03140173	Monne à Autels-saint-bazile (l...	LN ok	t	300011989.00...	I1330600	rivière la monne	14029
8	9036	10974	03140074	L'Heriers à Saint-martin-d...	BDMAP - autres	f	350004388.00...	I0212551	NULL	14478
9	9410	1651	03950024	Riviere l' Oise à Neuville-sur-oi...	LN ok	t	300011299.00...	H---0100	rivière l'oise	95323
10	9789	3202	03780010	Riviere l' Aubette à Tes...	LN ok	t	300011181.00...	H3010600	rivière l'aubette	78609
11	10307	5380	03780033	Fleuve la Seine à Acheres // S...	LN ok	t	300000572.00...	F7128801	fleuve la seine	78005
12	10327	5530	03780029	Ruisseau la Montcient à S...	LN ok	t	300010886.00...	H3018000	ruisseau la montcient	78536
13	460	1776	03610173	La Dives à Saint-lambert...	LN ok	t	300014016.00...	I1--0200	fleuve la dives	61490
14	1083	192	03140145	La Dives à Beaumais // A...	RCS - coord BDMAP	t	300012755.00...	I1--0200	fleuve la dives	14053
15	2595	11087	03140109	L'Ante à Eraines // Aval pont cd...	BDMAP - autres	f	300012474.00...	I1210600	rivière l'ante	14244
16	2952	1777	03610163	La Dives à Neauphe-sur...	LN ok	t	300013872.00...	I1--0200	fleuve la dives	61490
17	3831	5375	03950022	Fleuve la Seine à Argenteuil //...	LN ok	t	300012773.00...	----0010	fleuve la seine	92036
18	4220	7050	03780008	Riviere la Vaucouleurs à...	LN ok	t	300037315.00...	H3071001	rivière la vaucouleurs	78185
19	4221	7051	03780007	Riviere la Vaucouleurs à...	LN ok	t	300037300.00...	H3072801	rivière la vaucouleurs	78677
20	4226	7078	03270015	La Guiel à Verneusses //...	LN ok	t	300013073.00...	H6110600	rivière la guiel	27680

# DB Manager plugin



# DB Manager plugin

SQL window - local\_91\_enema [PostGIS]

SQL query:

```
select * from bdmap where gid in (1, 2, 3, 4, 5, 6, 7, 10)
```

Execute (F5) 10 rows, 0.0 seconds Clear

Result:

	gid	sg_id	st_codeesp	nom_statio	source	bien_proje	id_bdcar
1	1	61	02520304	La Meuse à Goncourt // p...	RCS - coord BDMAP	t	200024306.
2	2	64	02540038	La Moselle à Tonnoy // 1.5k...	RCS - coord BDMAP	t	200018545.
3	3	67	02540102	La Moselle à Tonnoy // 1.5k...	RCS - coord BDMAP	t	200018545.
4	4	69	02540142	La Meurthe à Saint-clement...	RCS - coord BDMAP	t	200018716.
5	5	9606	06390343	Doubs à Molay // Gratte p...	BDMAP - autres	f	602005914.

< >

☒ Load as new layer

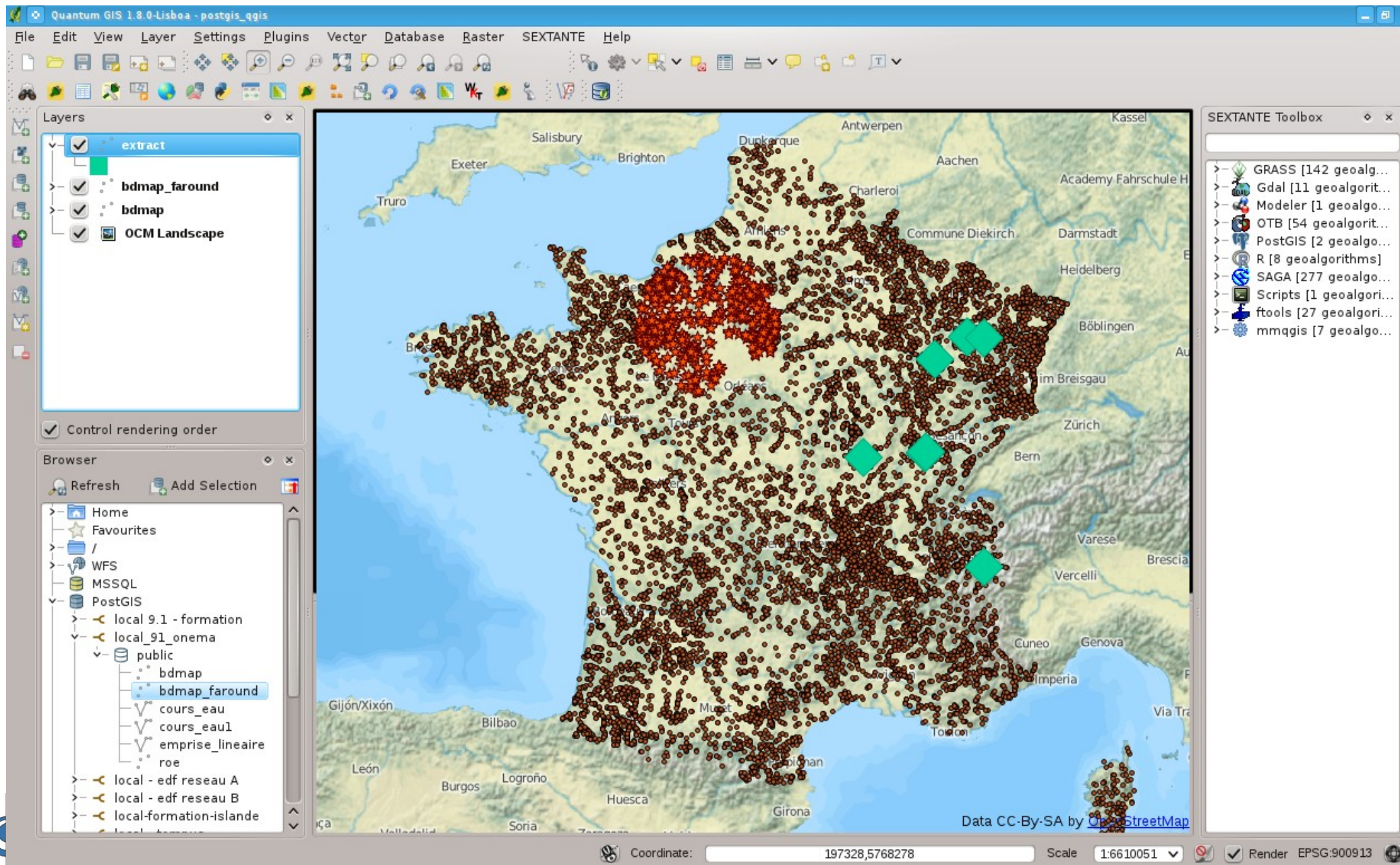
Column with unique integer values:  Geometry column:

Layer name (prefix):

Retrieve columns Load now! Close



# DB Manager plugin

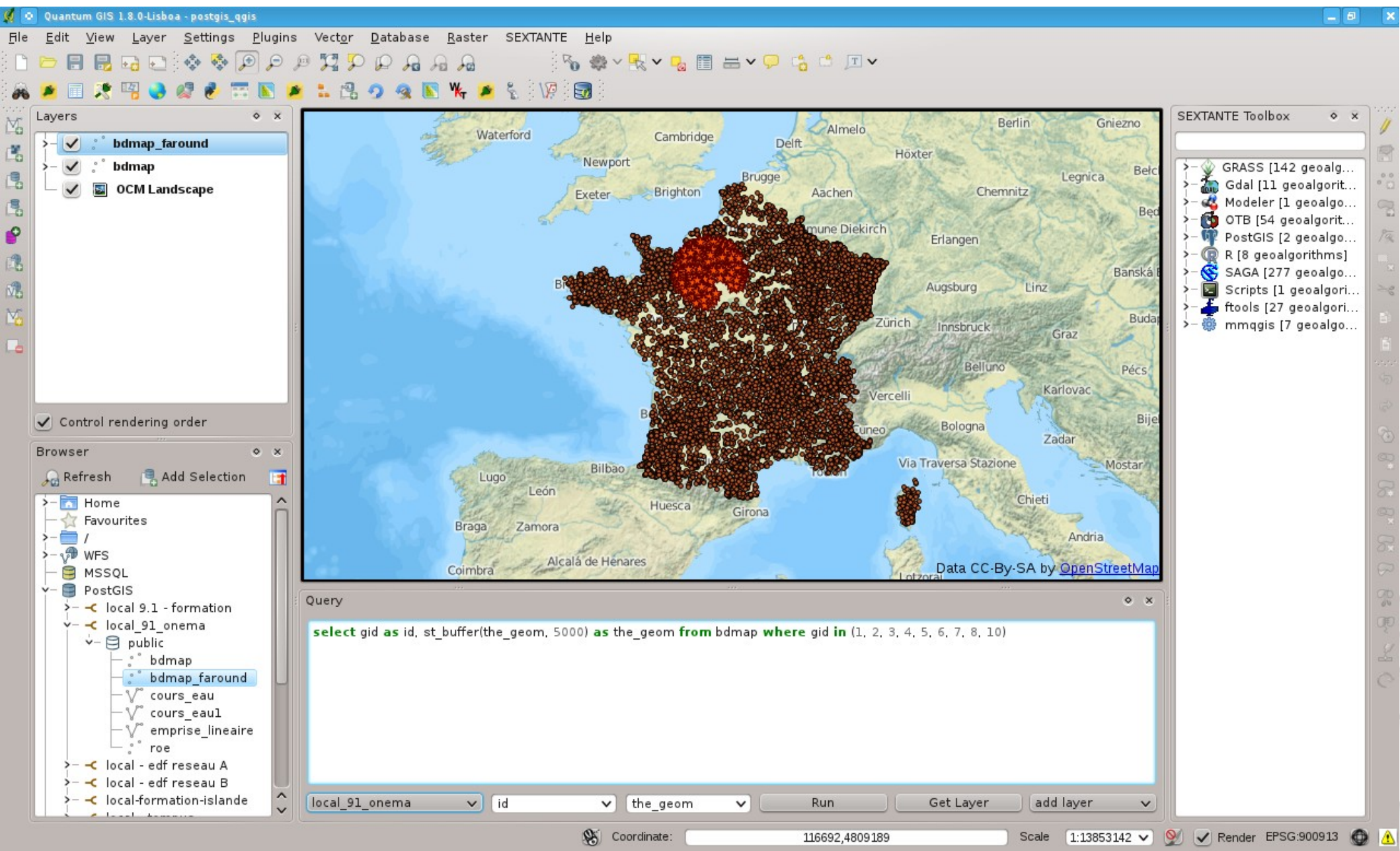


# Fast SQL Layer

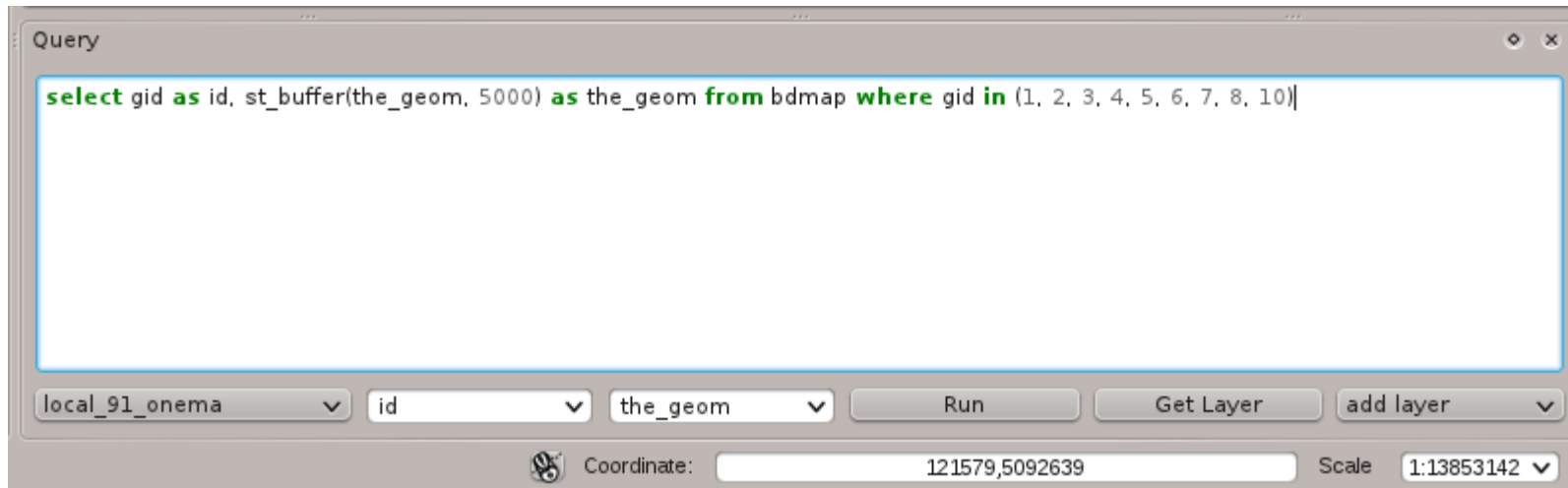




# Fast SQL Layer plugin

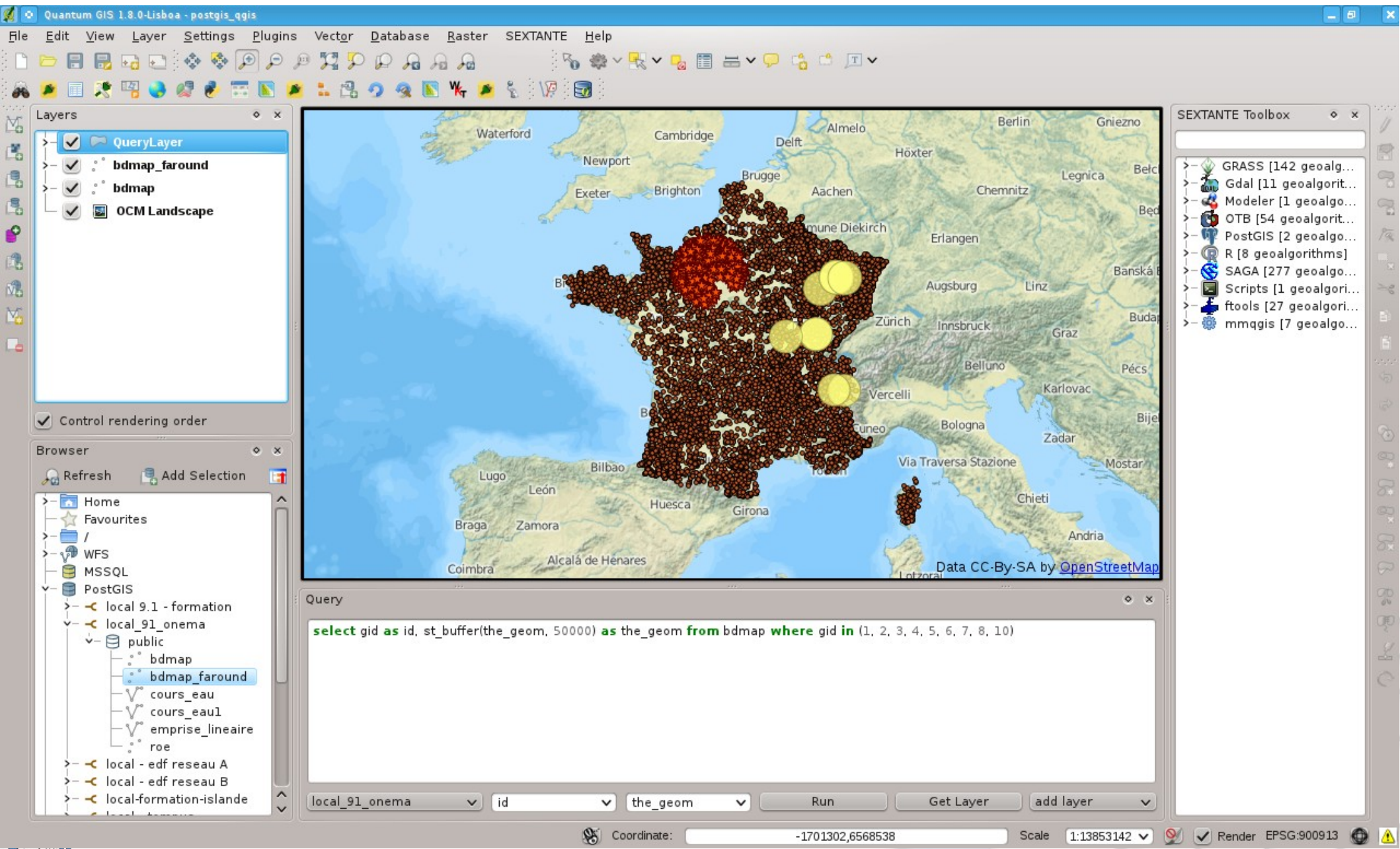


# Fast SQL Layer plugin





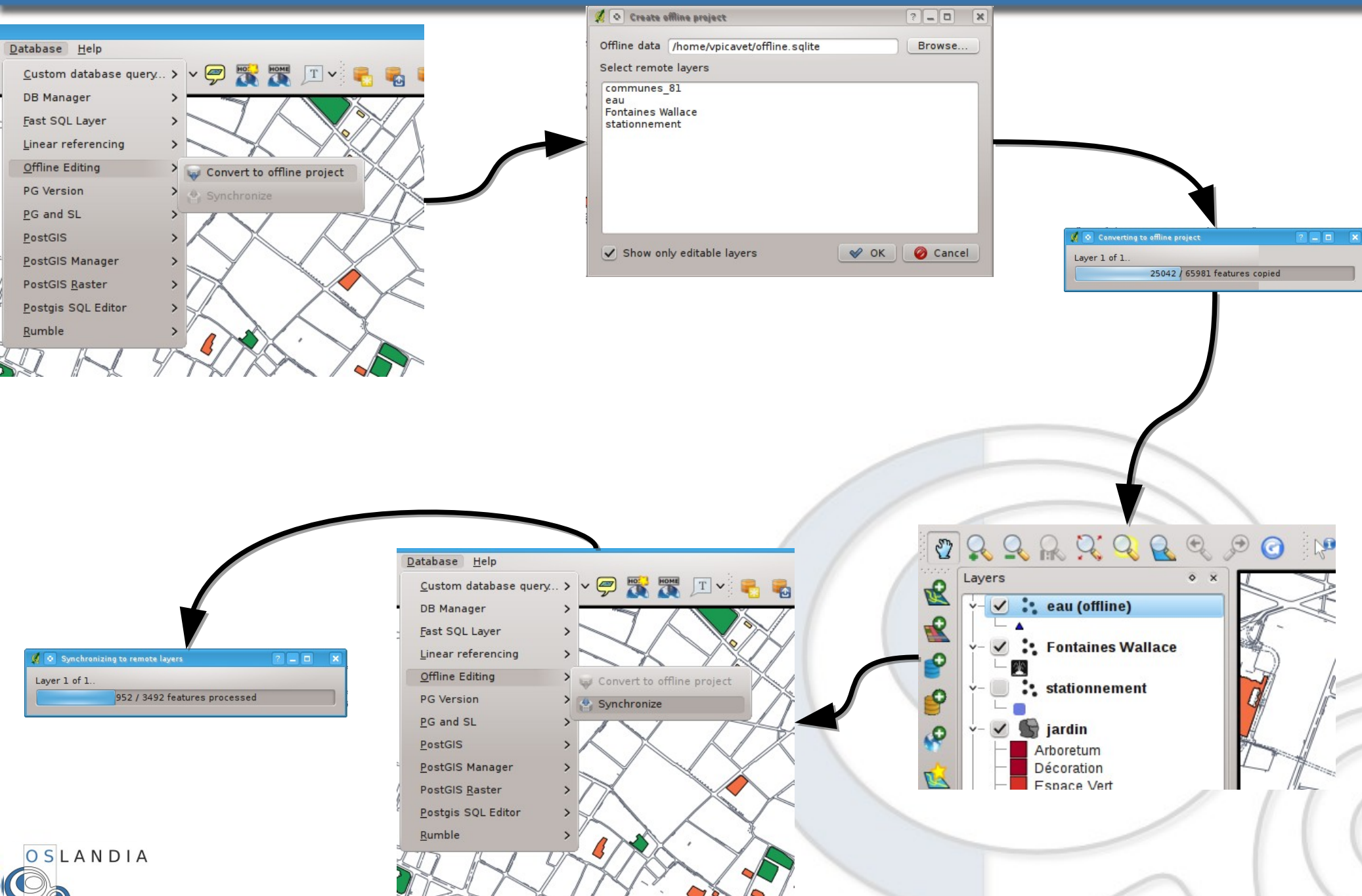
# Fast SQL Layer plugin



# Offline editing



# Native support : offline editing



# Native support : offline editing

- Trunk plugin by SourcePole
- Prepare layer
  - → local spatialite database
- Edit locally
- Resynchronize
  - → save to PostGIS
- Full layer
- No conflict management
- → Use with updatable views

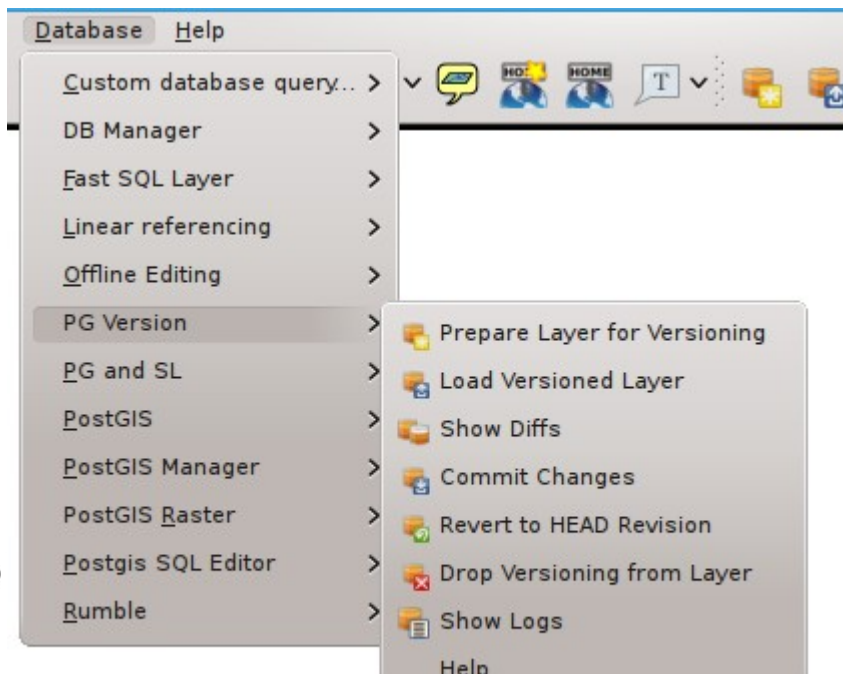


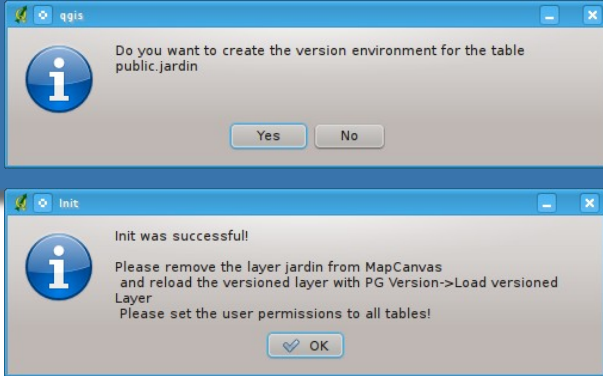
# Versionning



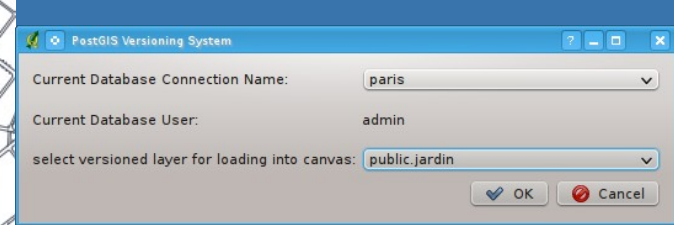
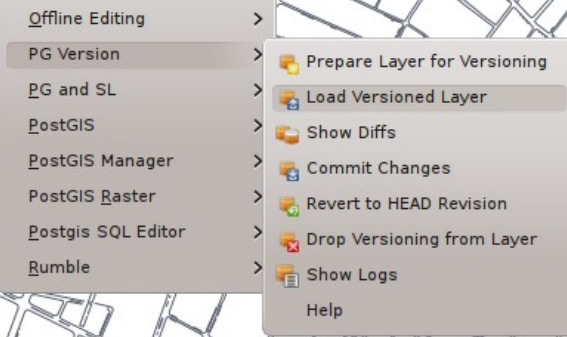
# Plugin : pgVersion

- Pl/pgSQL + Python plugin by Horst Duester
- Subversion – like
- Conflict management
- Revisions/History management

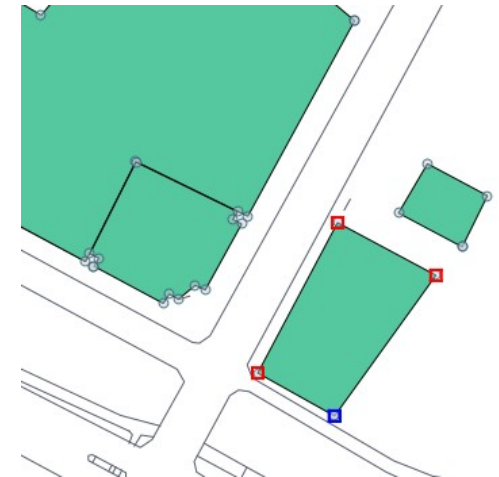




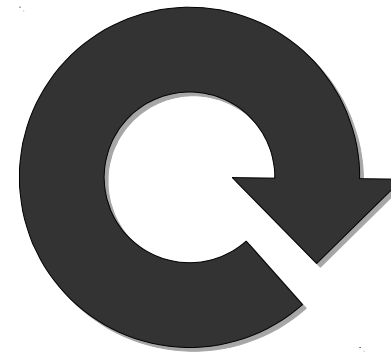
## Initialize



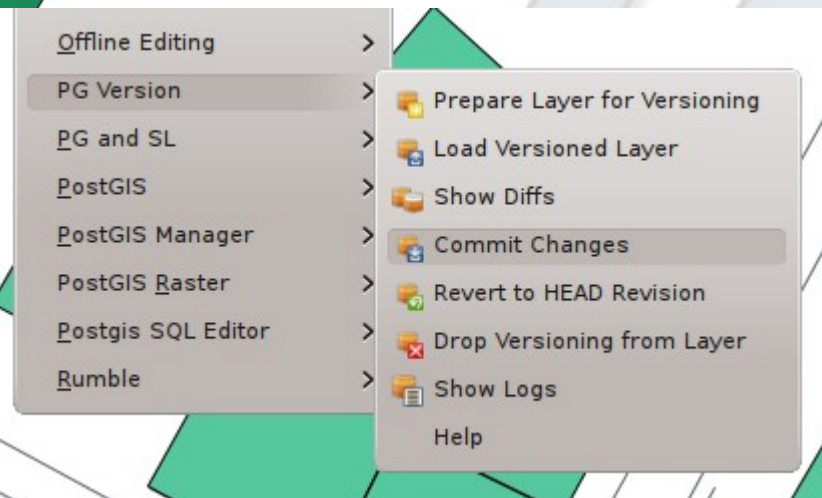
## Load layer



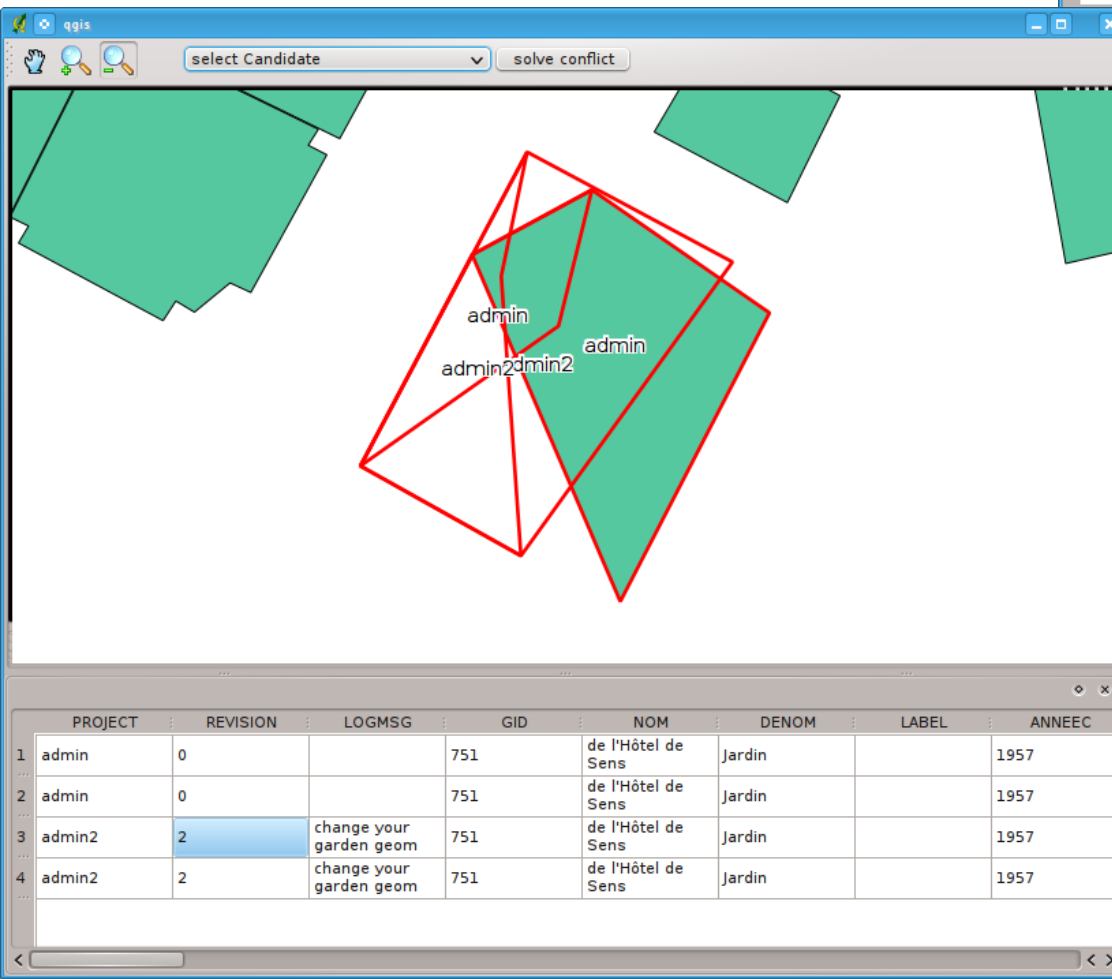
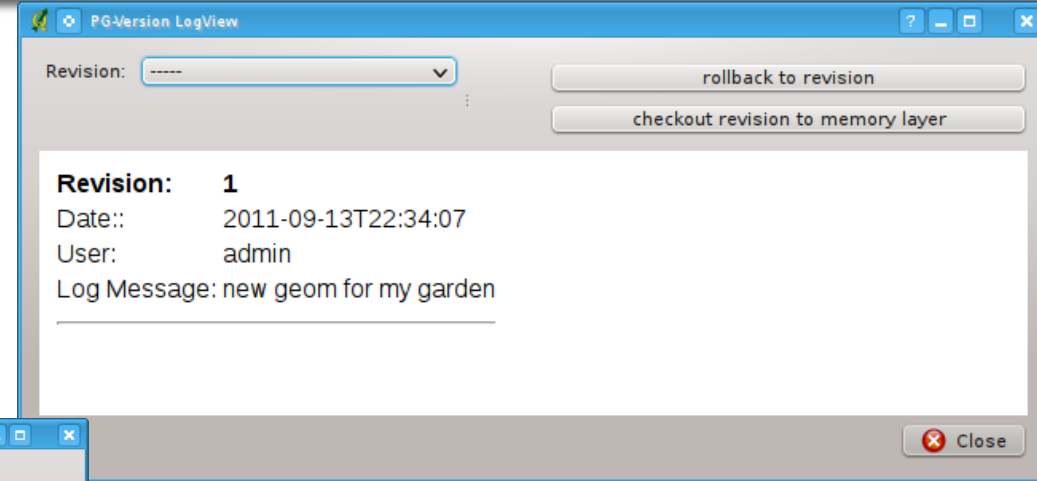
## Edit & save layer



## Commit changes



# Plugin : pgVersion



**Revision log**

**Conflict management  
on commit**



# PostGIS Raster



# Add PostGIS Raster

**Load Raster to Postgis**

Connection:

Input Raster File:

Output Table Name:

SRID:

☒ Advanced Options

☒ Custom tiling

Block size X (bytes):

Block size Y (bytes):

Number of overviews:

☐ Only register file as an external table

☐ Append tiles to existing table

## Load PostGIS Raster to QGIS

**Load Postgis Raster layer**

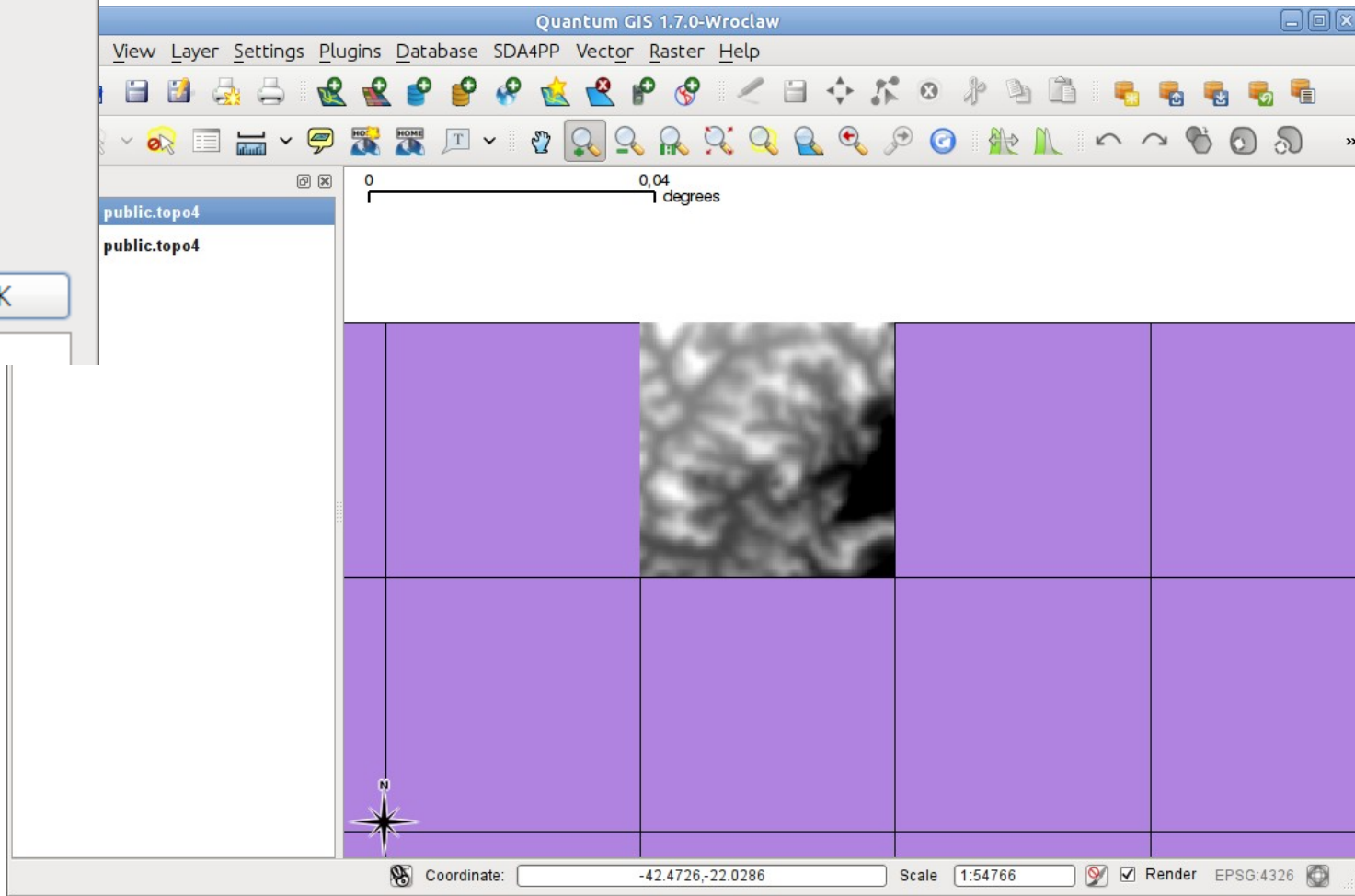
Postgis' connection:

Reading mode:

	Schema	Table	SRID	Pixel Ty
6	public	recorte2	4326	['32BF']
7	public	rasterTable	4326	['32BF']

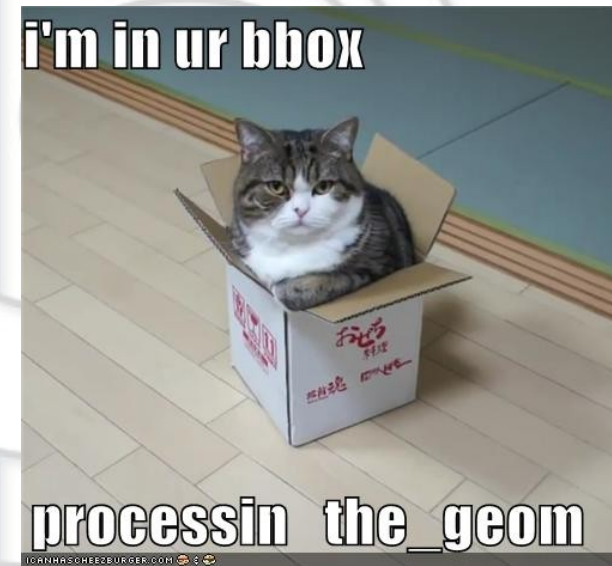
Table name:

## Load file to PostGIS Raster



# Conclusion

- QGIS and PostGIS play well together !
- Most use cases covered
- More integration work needed
- Sextante framework → ELT
- Lots of plugins
- QGIS dev follows PostGIS dev



# Thanks

## Questions ?

Now,

Around a beer or

[vincent.picavet@oslandia.com](mailto:vincent.picavet@oslandia.com)

twitter : @vpicavet – [www.oslandia.com](http://www.oslandia.com)