

PostGIS



PostGIS 2.0 is out !

(.. since 2012 ..)



Functions



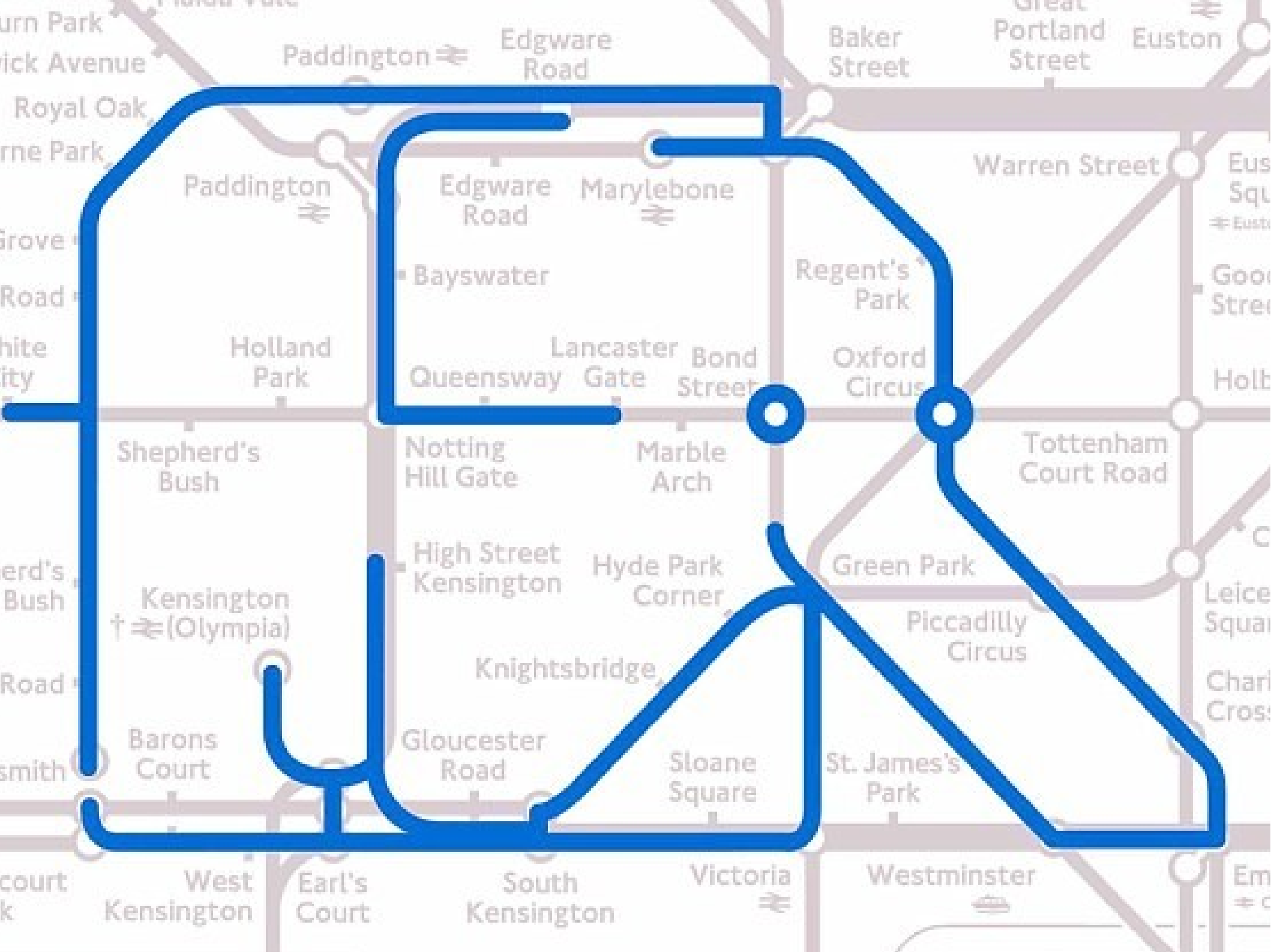
PostGIS 2.1



AsTopoJSON	ST_FromGDALRaster	ST_Roughness
clearTopoGeom	ST_GeomFromGeoHash	ST_SetValues
Get_Geocode_Setting	ST_InvDistWeight4ma	ST_Simplify
postgis_sfcgal_version	ST_MapAlgebra	ST_StraightSkeleton
Set_Geocode_Setting	ST_MinConvexHull	ST_Summary
ST_3DArea	ST_MinDist4ma	ST_Tessellate
ST_3DIntersection	ST_MinkowskiSum	ST_Tile
ST_ColorMap	ST_NearestValue	ST_Touches
ST_Contains	ST_Neighborhood	ST_TPI
ST_ContainsProperly	ST_Orientation	ST_TRI
ST_CoveredBy	ST_Overlaps	ST_Union
ST_Covers	ST_PixelAsCentroid	ST_Within
ST_DelaunayTriangles	ST_PixelAsCentroids	ST_WorldToRasterCoord
ST_DFullyWithin	ST_PixelAsPoint	UpdateRasterSRID
ST_Disjoint	ST_PixelAsPoints	Drop_Nation_Tables_Generate_Script
ST_DumpValues	ST_PixelOfValue	Loader_Generate_Nation_Script
ST_DWithin	ST_PointFromGeoHash	ST_NotSameAlignmentReason
ST_Extrude	ST_RasterToWorldCoord	ST_Box2dFromGeoHash
ST_ForceLHR	ST_Resize	Pagc_Normalize_Address

Topology

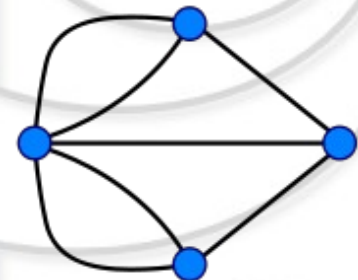
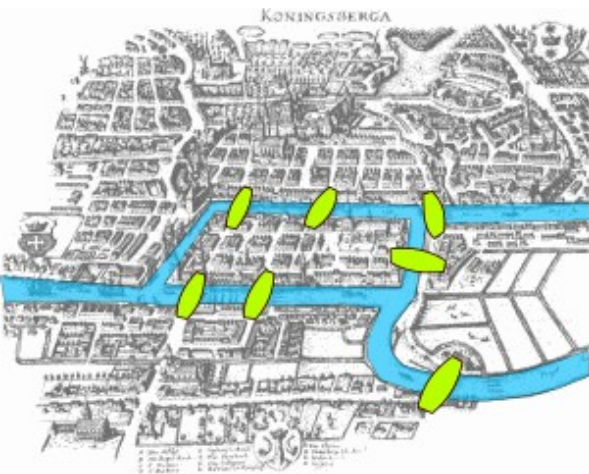




Topology - Graphs

- › **Explicit relations between objects**
- › **Graph representation**
- › **OGC : Node / edge / face**
- › **TopoGeometry datatype**
- › **SQL/MM support**
- › **Sandro Santilli - Toscane Region**

Released



create table

rec_res2 as

with recursive

search_graph(edge_id, start_node, depth, path, length, cycle) as (

select

g.edge_id, g.start_node, 1 as depth, ARRAY[g.edge_id] as path
, st_length(geom) as length, false as cycle

from

hydro.edge as g

where

edge_id = 173832

union all

select

g.edge_id
, g.start_node
, sg.depth + 1 as depth
, path || g.edge_id as path
, sg.length + st_length(g.geom) as length
, g.edge_id = ANY(path) as cycle

from

hydro.edge as g

join

search_graph as sg

on

sg.start_node = g.end_node

where

not cycle

)

select

sg.*
, edge.geom as geom

from

search_graph as sg

join

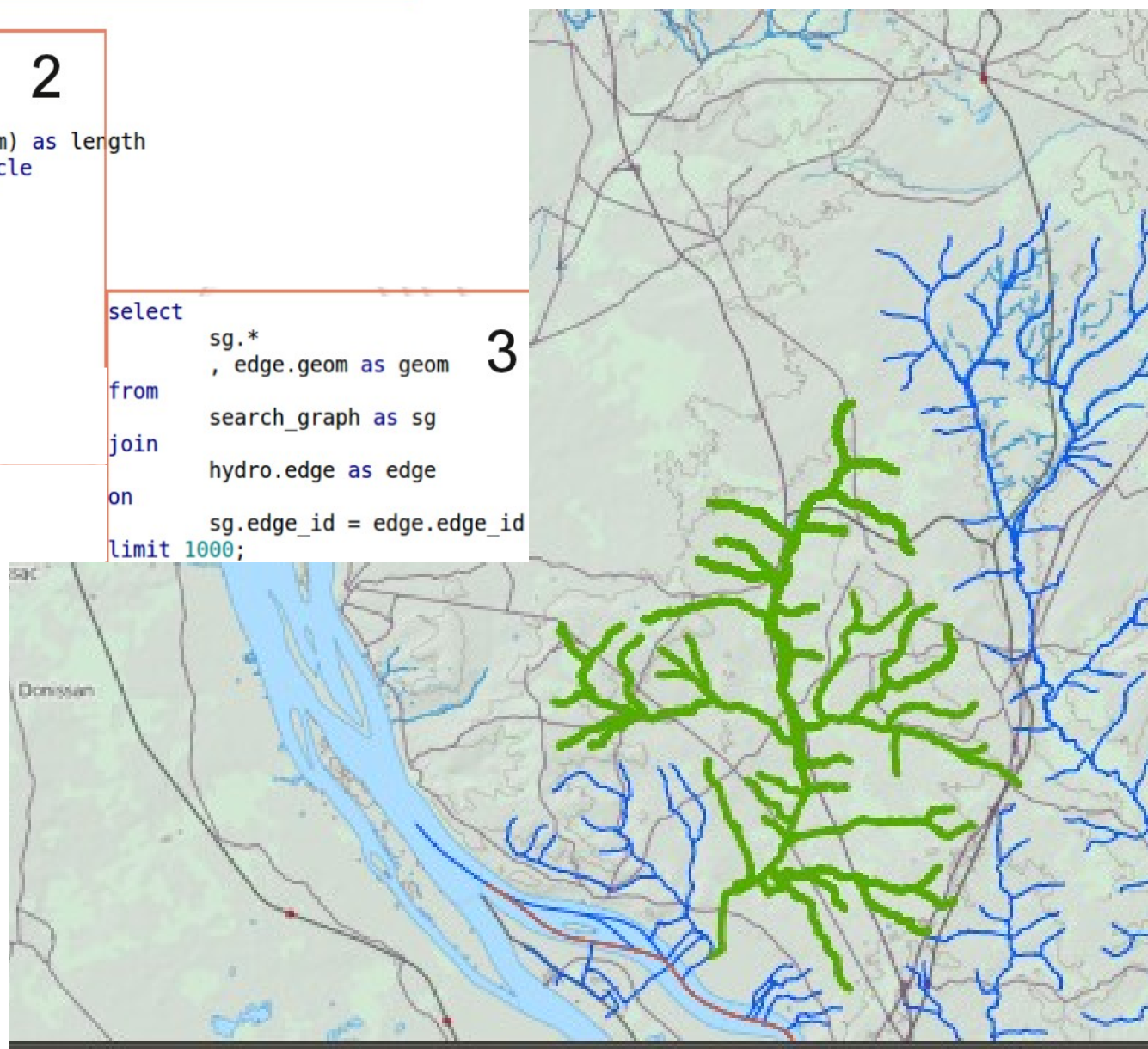
hydro.edge as edge

on

sg.edge_id = edge.edge_id

limit 1000;

Recursive CTE



Raster



Rasters

- › **Raster / vector analysis**
- › **New datatype**
 - › **Looks like geometry**
 - › **But for rasters**
- › **Multiresolution, multiband, tile coverage**
- › **Import/export (GDAL)**
- › **Functions**
 - › **Statistics, reprojection, edit, compute**
 - › **Vector/raster functions**
 - › **More & more functions & faster**

Released

WIP

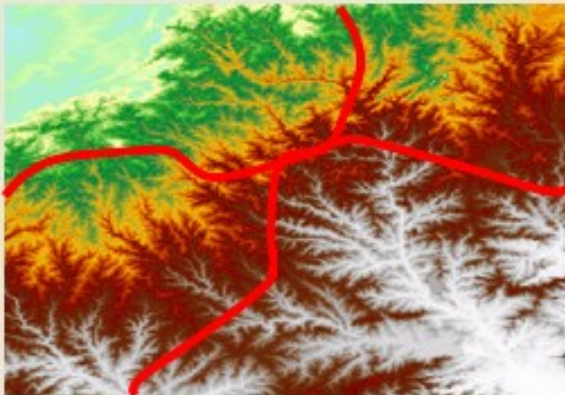
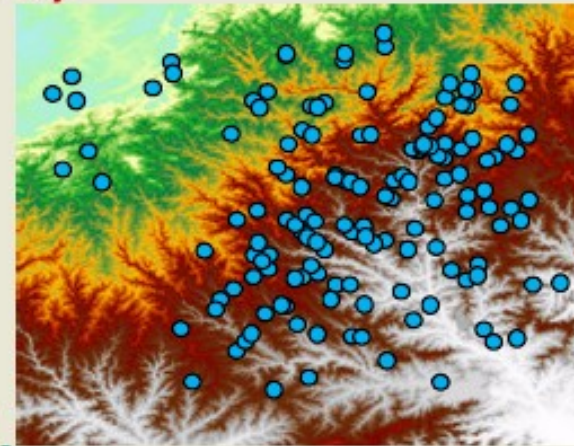
Rasters

Extract ground elevation values for lidar points...

- `SELECT pointID, ST_Value(rast, geom) elevation`
`FROM lidar, srtm WHERE ST_Intersects(geom, rast)`

Intersect a road network to extract elevation values for each road segment

- `SELECT roadID,`
`(ST_Intersection(geom, rast)).geom road,`
`(ST_Intersection(geom, rast)).val elevation`
`FROM roadNetwork, srtm WHERE ST_Intersects(geom, rast)`



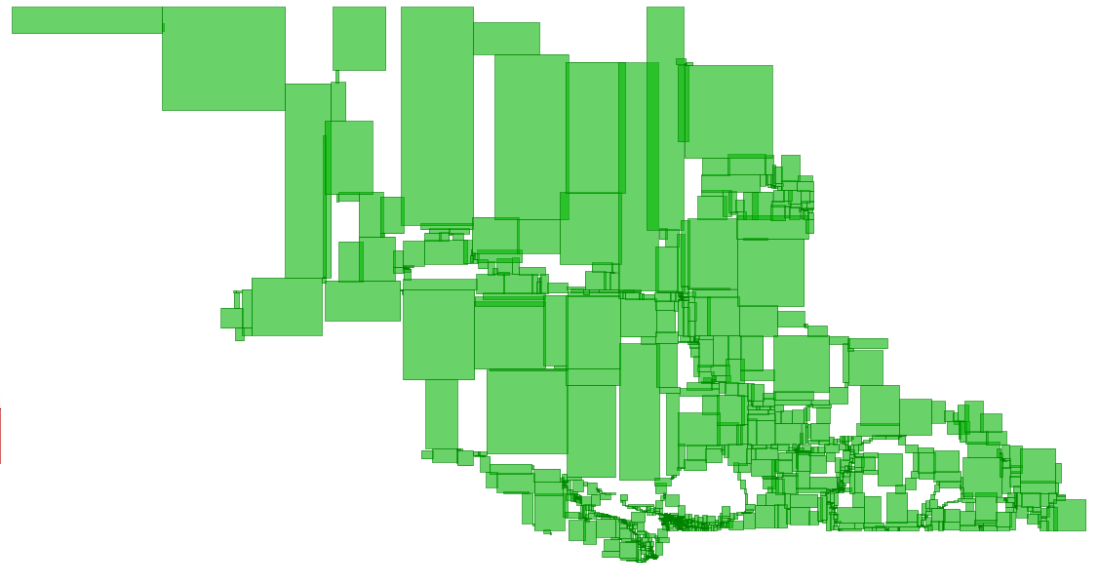
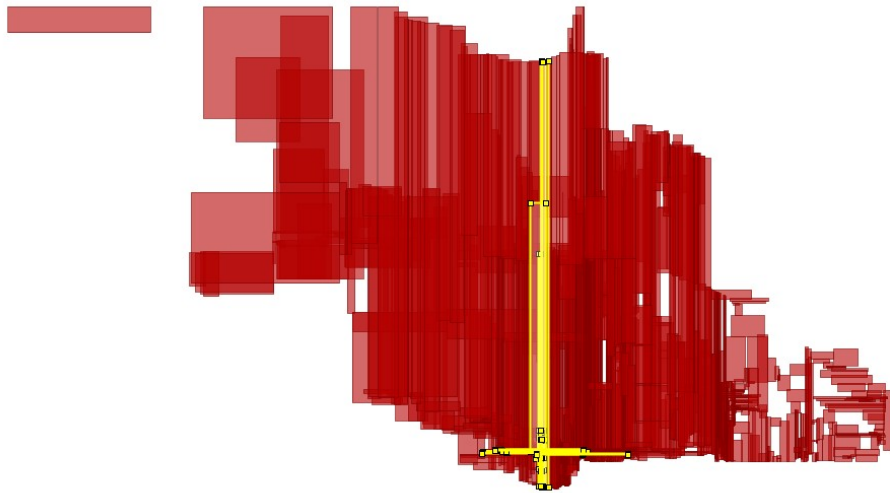
Indexing



Indexing - pick-split

- › **#define KOROTKOV_SPLIT 1**
- › « **Double sorting-based node splitting algorithm for R-tree** »
- › **Huh ?**
- › **→ Better bbox organization in indexes**

Released



(Suggestion of presentation)

KNN-Search



- › **KNN-GIST search in PostgreSQL 9.1+**
- › **Use indexes !**
- › **Spatial nearest neighbors**

```
SELECT name, gid FROM geonames
ORDER BY
    geom <-> st_setsrid(st_makepoint(-90,40),4326)
LIMIT 10;
```

- › **Distance operator**
 - › **<-> or <#> : center or bbox**
 - › **Need to refine for non-point geometries**

SP-Gist

- › « SP » = SPatial
- › New PG index type
- › Faster to read
- › 3x faster to build
- › Good fit for spatial data
- › GSoC 2014
- › Commitable code ?

WIP



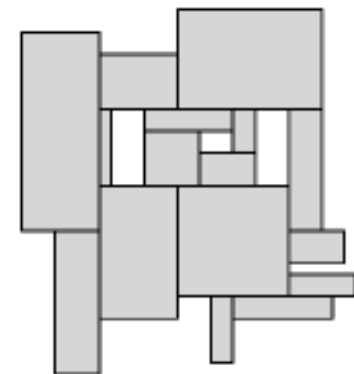
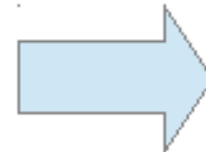
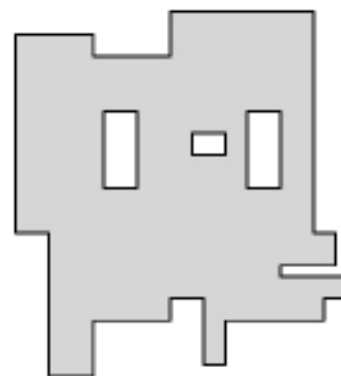
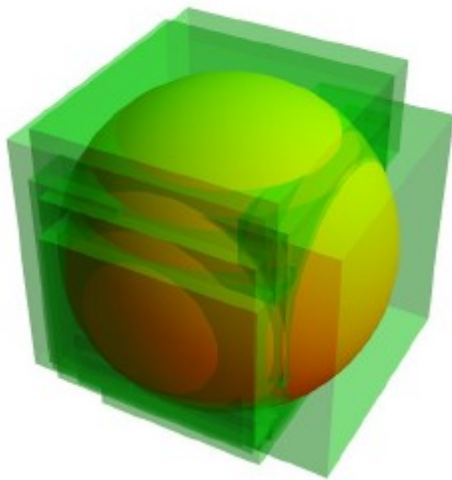


VODKA



- › **Korotkov, Bartunov, Sigaev**
- › **create index .. using vodka**
- › **Derivation of JSONB indexing**
- › **R-Tree based on GiST as entry tree**
- › **Use multiple boxes per polygons**

WIP



Geocoding



PAGC in PostGIS

- › **Address standardizer as PG extension**
- › **standardizer → PostGIS project**
- › **Soon replace TIGER parts**
- › **Later work on Next gen. Geocoder**
 - › **European addressing**
 - › **...**
 - › **Collaboration with PAGC team**
- › **Stephen Woodbridge & Regina Obe**

Done

WIP

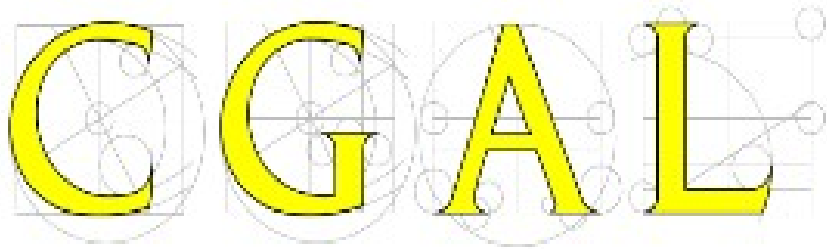
3D



PostGIS 3D / SFCGAL

SFCGAL

=



+



ISO 19107:2013

ISO 19125:2013



CGAL

SFCGAL functions

ST_3DIntersection

ST_Tessellate

ST_3DArea

ST_Extrude

ST_ForceLHR

ST_Orientation

ST_MinkowskiSum

ST_StraightSkeleton



SFCGAL news

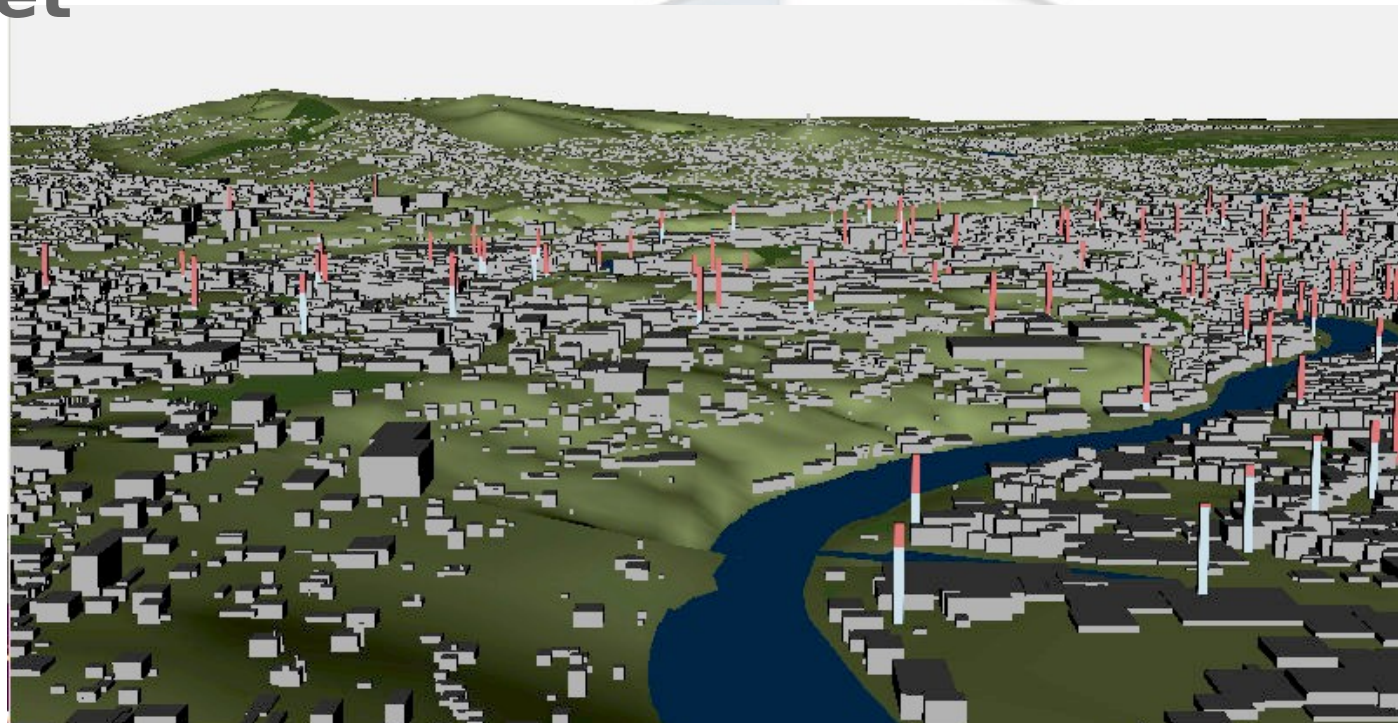
- › **create extension sfcgal ;**
- › **Windows binaries**
- › **Some more functions**
- › **CI integration (regress, unit)**
- › **Texture support**
- › **More import/export, « GeoJSON 3D », CityGML**



Viewer : Horao

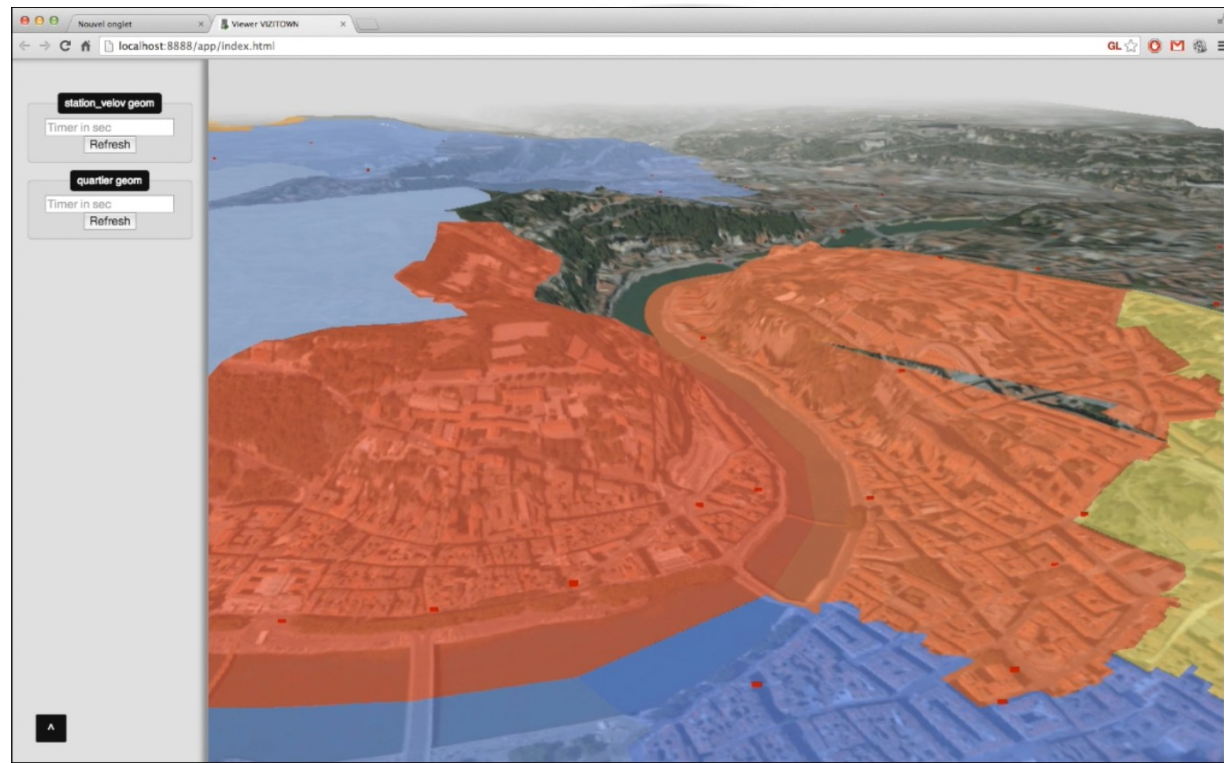
- › OpenSceneGraph-based
- › Independant + QGIS plugin
- › Synchronization with QGIS
- › MNT, 3D, custom queries
- › www.horao.net

Released



Viewer : Vizitown

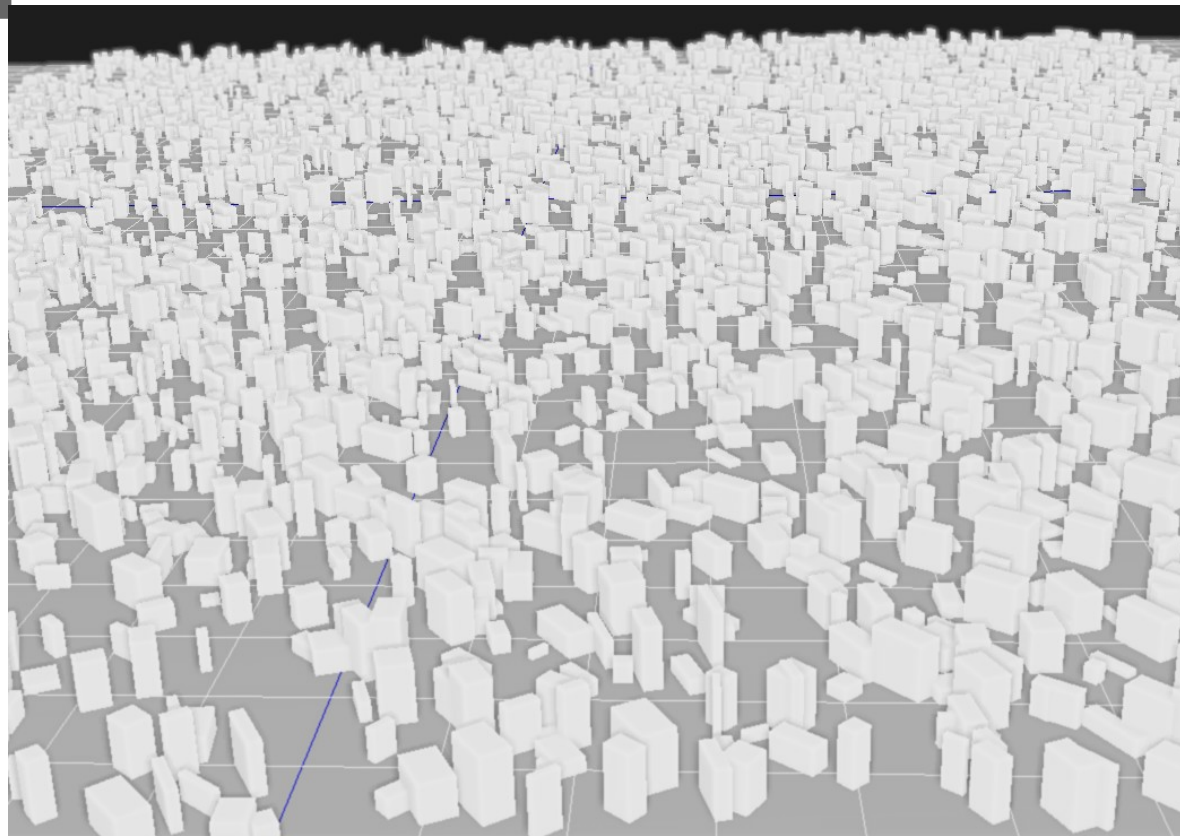
- › POC by Oslandia + students
- › Web client
- › Synchronization with QGIS
- › 2D, 2.5D, 3D, realtime, layers, symbology...



Viewer : WebGL NG

- › Full WebGL viewer
- › Mixed 2D/3D viewer/generator
- › Using Three.js power
- › PostGIS companion
- › Stay tuned !

WIP



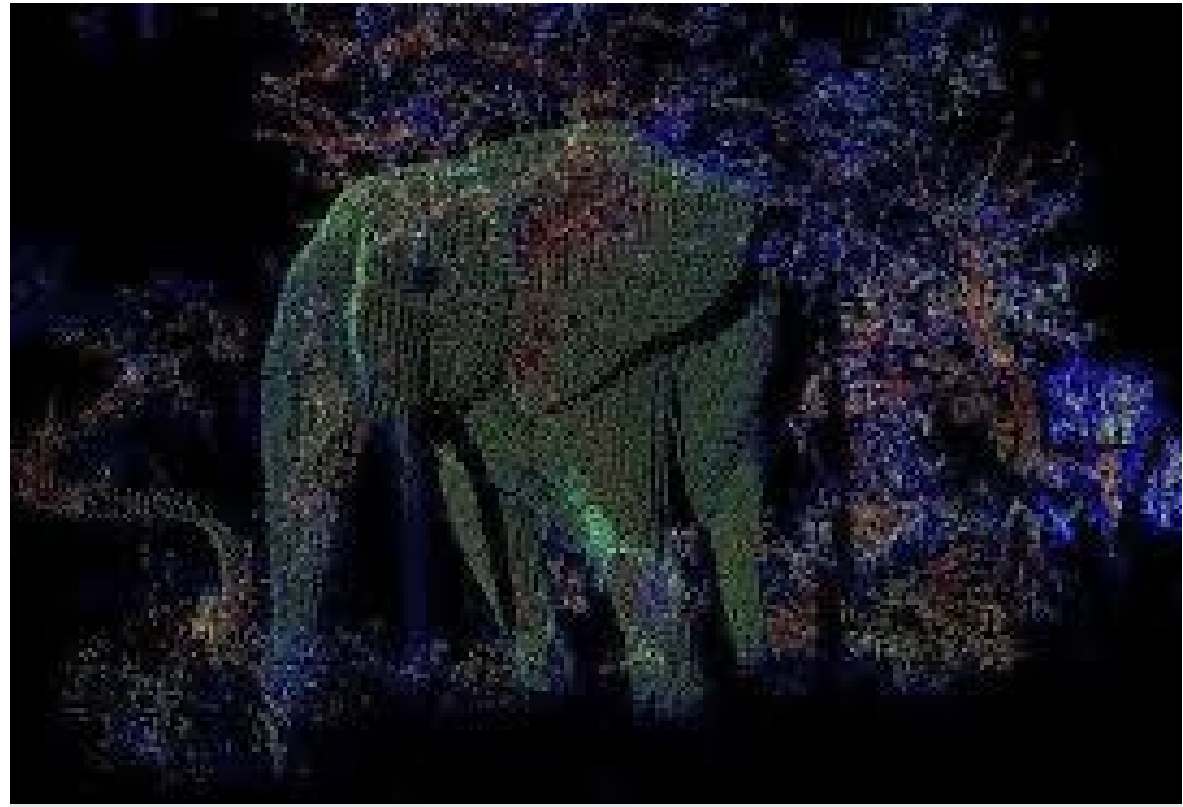
PointCloud

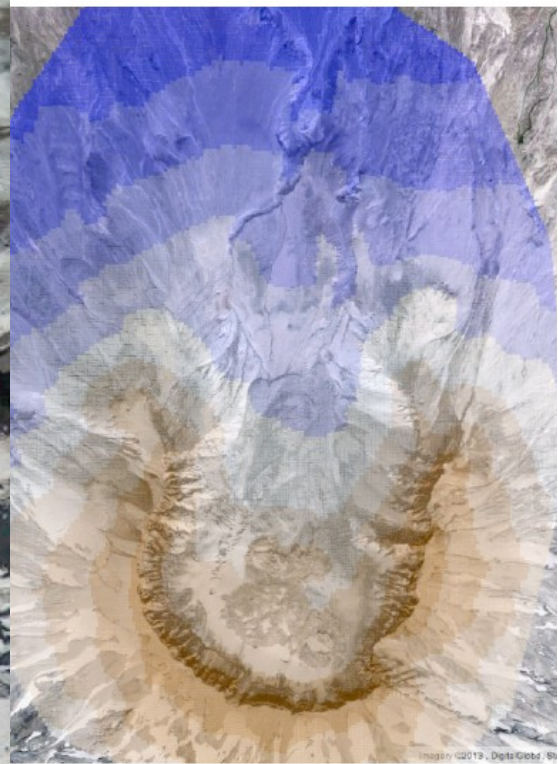
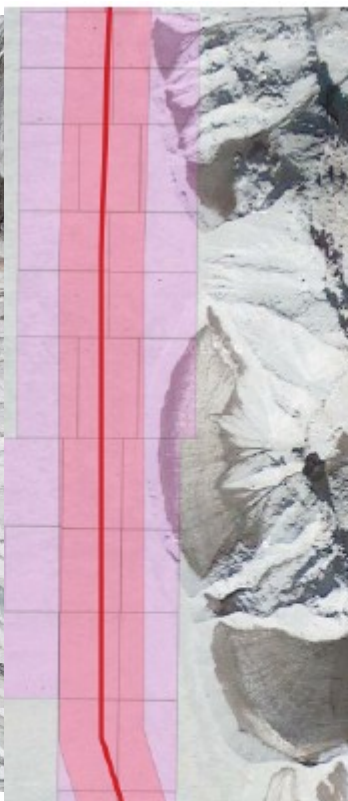
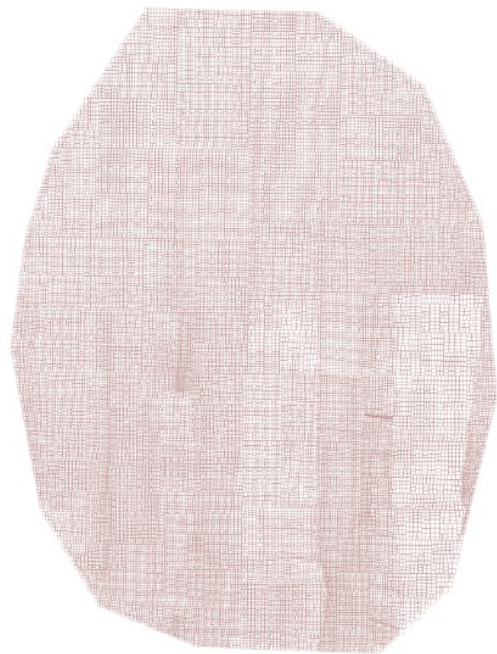


PointCloud

- › **PostgreSQL extension + PostGIS**
- › **Paul Ramsey - Natural resources Canada**
- › **LIDAR - Huge point datasets**
- › **N-Dimensional**
- › **PDAL I/O**

- › **Point patches**
- › **Indexes**
- › **Functions**



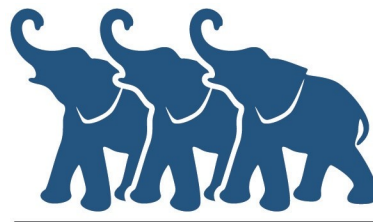
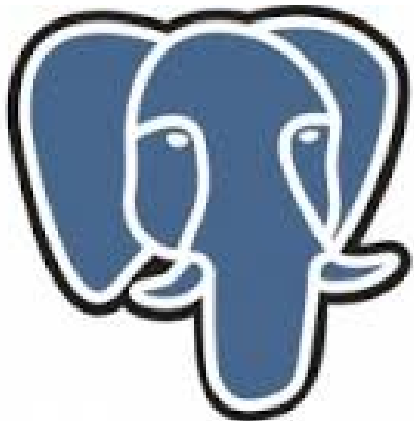


PG 9.x



PG → PostGIS

- › **PostgreSQL very active !**
- › **PG improvements → PostGIS benefits :-)**
- › **Some parts :**
 - › **JSONB (~MongoDB with ACID)**
 - › **Multimaster logical replication**
 - › **Postgres-XL (parallel PG)**
 - › **Oracle_fdw spatial**



Postgres-XL



**That's
(almost)
all**



Thank them



Mark Cave-Ayland	Brian Hamlin	Leo Hsu
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Ben Jubb	Klaus Foerster	People I forgot (sorry)
Bernhard Reiter	Kris Jurka	

Thank you



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