

ENVISIONING A GEOLOGIC DATABASE UTOPIA: IS LIFE IN A POST GIS – OR POSTGIS – WORLD ANY BETTER?



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“GIS is not as simple as it used to be.” - Thierry Gregorius

As part of my job in the global energy industry I meet a lot of geoscientists. Highly passionate about all aspects of earth science, they're geologists, geophysicists, or environmental scientists. They use GIS daily but don't consider themselves to be GIS professionals any more than they are Excel or software professionals. For them, GIS is a means to an end.

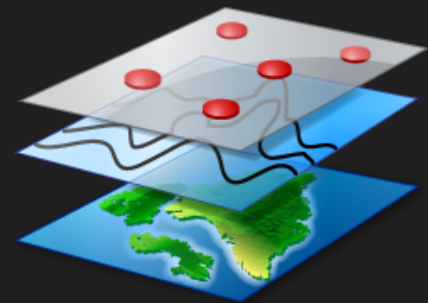
When one geoscientist recently said that *“GIS is not as simple as it used to be”*, it pretty much summed up the mood I'm picking up in a lot of places. The state of GIS, data and IT are a big frustration. The geoscience community has been using geospatial tools for decades, but the issues they face with GIS have remained unchanged – in fact, they're getting worse.

































COMPLAINTS

- Proliferation of data formats
- Interoperability
- Conversion tools
- Multitude of data sources
- Complexity of interfaces
- Required add-ons
- Lack of flexible data models
- Analytical tools for 'messy' data

*.shp, *.kml, *.csv, *.tab,
*.asc, *.gdb, *.e00, *.geojson
etc

FME, GDAL, GeoKettle



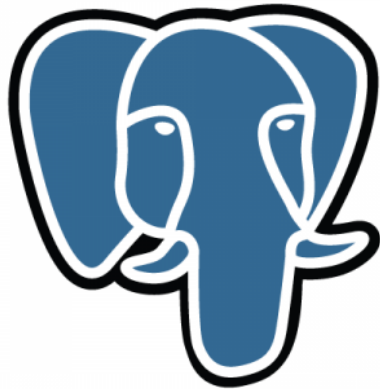
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Scratch
Ab
Barnard
+ New
+ NHDH_VT.gdb
Barnard_Roylton.shp
Boundary.shp
Boundary_TWNBNDs_poly
BoundaryOther_BNDHASH
BoundaryOther_BNDHASH
E911 Road Centerlines.lyr
Emergency_RDS_line.shp
EmergencyE911_RDS.txt
EmergencyE911_RDS.xml
nwi0709_l.shp
nwi0709_p.shp
nwi0710_l.shp
nwi0710_p.shp
nwi0809_l.shp
nwi0809_p.shp
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nwi0810_p.shp
nwi0910_l.shp
nwi0910_p.shp
WaterWetlands_NWI.txt

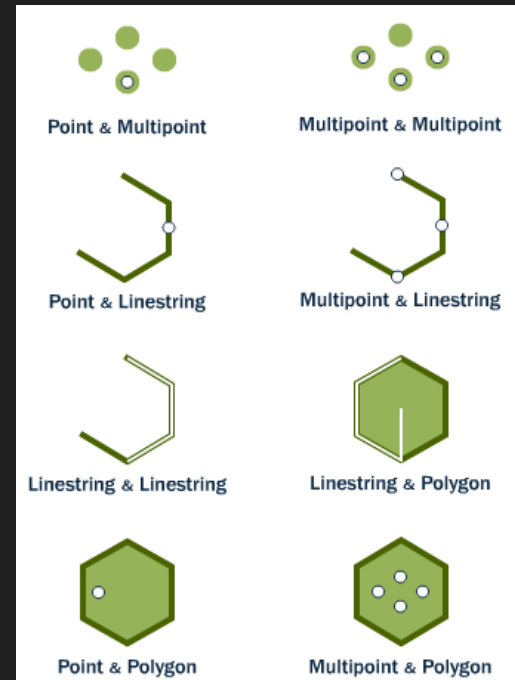
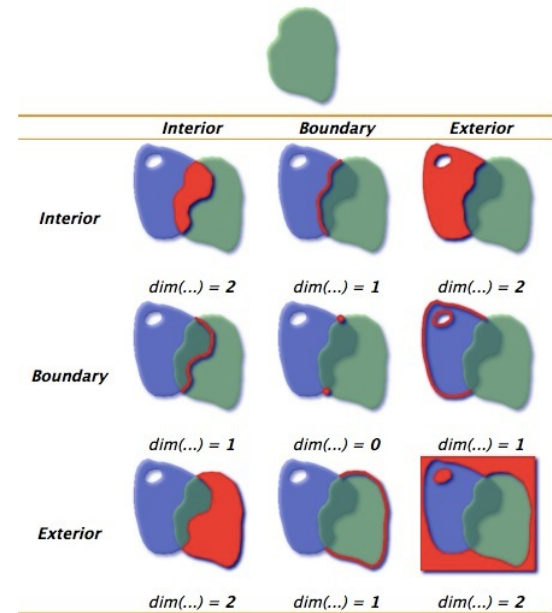
Name	Type
Hydrography	File Geodatabase Feature Dataset
WBD	File Geodatabase Feature Dataset
ExternalCrosswalk	File Geodatabase Table
NHDAreaEventFCToMeta	File Geodatabase Relationship Class
NHDAreaToMeta	File Geodatabase Relationship Class
NHDFCode	File Geodatabase Table
NHDFeatureToMetadata	File Geodatabase Table
NHDFlow	File Geodatabase Table
NHDFlowlineToMeta	File Geodatabase Relationship Class
NHDFlowlineVAA	File Geodatabase Table
NHDLIneEventFCToMeta	File Geodatabase Relationship Class
NHDLIneToMeta	File Geodatabase Relationship Class
NHDMetadata	File Geodatabase Table
NHDMetadataHasSourceCitation	File Geodatabase Relationship Class
NHDMetaToFeature	File Geodatabase Relationship Class
NHDPInetEventFCToMeta	File Geodatabase Relationship Class
NHDPInetToMeta	File Geodatabase Relationship Class
NHDPProcessingParameters	File Geodatabase Table
NHDSReachCodeMaintenance	File Geodatabase Table
NHDSReachCrossReference	File Geodatabase Table
NHDSSourceCitation	File Geodatabase Table
NHDStatus	File Geodatabase Table
NHDVerticalRelationship	File Geodatabase Table
NHDWaterbodyToMeta	File Geodatabase Relationship Class



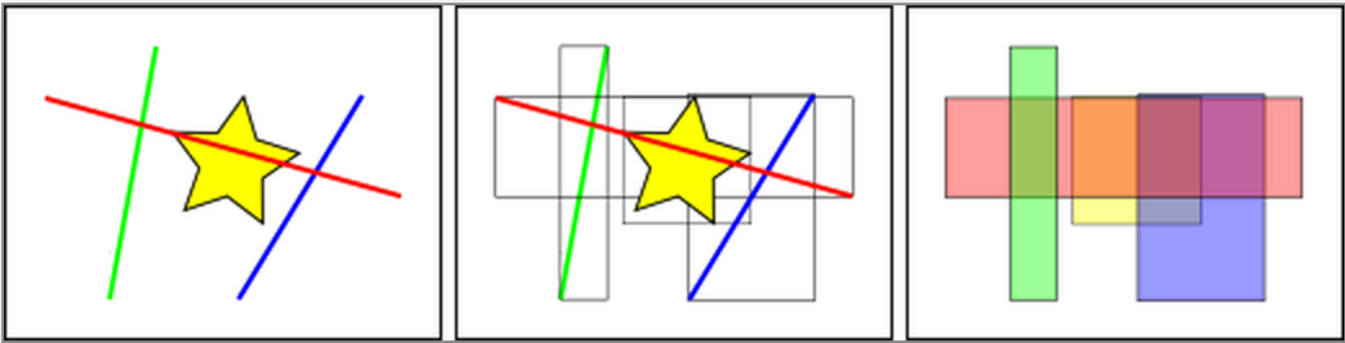
<http://j-vh.me/PMllyG>



PostgreSQL

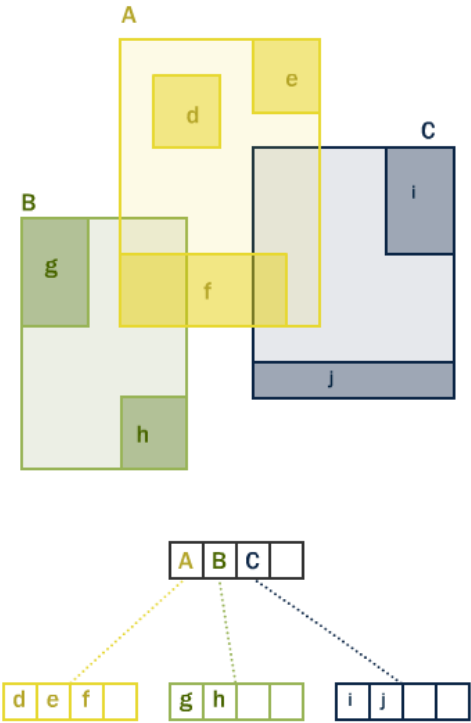


<http://j-vh.me/1jcAqUP>



In the figure above, the number of lines that intersect the yellow star is **one**, the red line. But the bounding boxes of features that intersect the yellow box is **two**, the red and blue ones.

R-tree Hierarchy



“How many **wells** terminate in a specific **bedrock** type, are within 1,000 meters of a specific **fault plane** and have a yield of > 50gpm”

8.3	Geometry Constructors
8.3.1	ST_BdPolyFromText
8.3.2	ST_BdMPolyFromText
8.3.3	ST_GeogFromText
8.3.4	ST_GeographyFromText
8.3.5	ST_GeogFromWKB
8.3.6	ST_GeomCollFromText
8.3.7	ST_GeomFromEWKB
8.3.8	ST_GeomFromEWKT
8.3.9	ST_GeometryFromText
8.3.10	ST_GeomFromGML
8.3.11	ST_GeomFromGeoJSON
8.3.12	ST_GeomFromKML
8.3.13	ST_GMLToSQL
8.3.14	ST_GeomFromText
8.3.15	ST_GeomFromWKB
8.3.16	ST_LineFromMultiPoint
8.3.17	ST_LineFromText
8.3.18	ST_LineFromWKB
8.3.19	ST_LinestringFromWKB
8.3.20	ST_MakeBox2D
8.3.21	ST_3DMakeBox
8.3.22	ST_MakeLine
8.3.23	ST_MakeEnvelope
8.3.24	ST_MakePolygon
8.3.25	ST_MakePoint

8.6	Geometry Outputs
8.6.1	ST_AsBinary
8.6.2	ST_AsEWKB
8.6.3	ST_AsEWKT
8.6.4	ST_AsGeoJSON
8.6.5	ST_AsGML
8.6.6	ST_AsHEXEWKB
8.6.7	ST_AsKML
8.6.8	ST_AsSVG
8.6.9	ST_AsX3D
8.6.10	ST_GeoHash
8.6.11	ST_AsText
8.6.12	ST_AsLatLonText

ArcGIS® ArcMap™

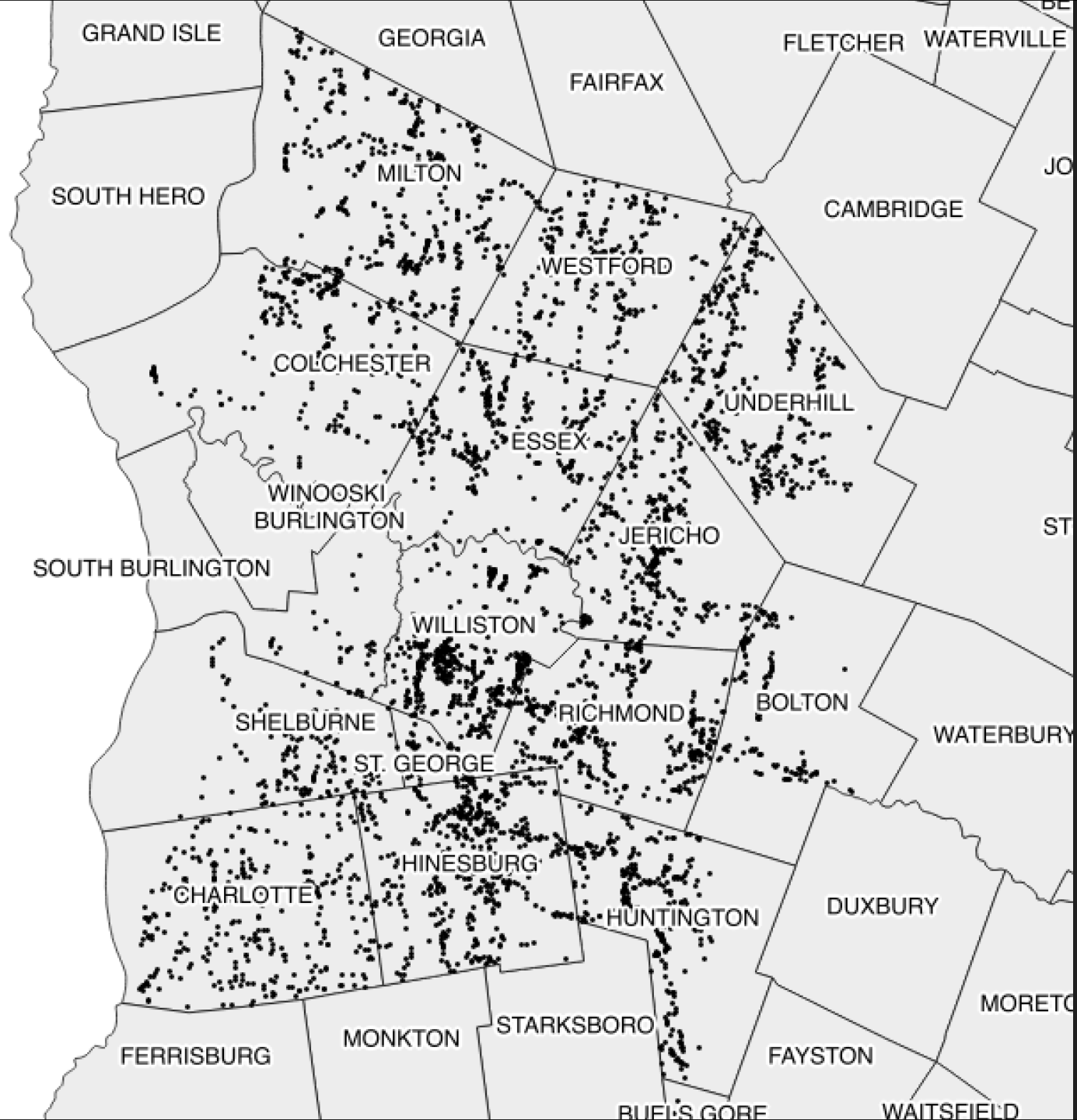
10.1

Initializing Application...



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VT_Wells on local socket

SQL Editor

Graphical Query Builder

Previous queries

SELECT "Wells".wellreport...

Delete

Delete All

```
SELECT
  Count(*)
FROM
  public."Wells"
WHERE "Wells".yieldgpm > '100';
```

Scratch pad

Output pane

Data Output

Explain

Messages

History

	count bigint
1	30

Query - VT_Wells on local socket *

SQL EditorGraphical Query Builder

Previous queries

SELECT "Towns".townname, COUNT(public."Wells".geom) as Well_Total FROM public."Towns", public."Wells" WHERE ST_Contains(public."Towns".geom, public."Wells".geom) GROUP BY "Towns".townname ORDER BY Well_Total | DESC;


DeleteDelete All

Scratch pad

Output pane

Data OutputExplainMessagesHistory

	townname character varying(18)	well_total bigint
1	HINESBURG	479
2	WILLISTON	467
3	MILTON	396
4	RICHMOND	348
5	UNDERHILL	347
6	JERICO	307
7	CHARLOTTE	306
8	ESSEX	298
9	HUNTINGTON	288
10	WESTFORD	258
11	COLCHESTER	224
12	SHELBURNE	146
13	BOLTON	117
14	ST. GEORGE	43
15	SOUTH BURLINGTON	34
16	BUELS GORE	4
17	WINOOSKI	2
18	BURLINGTON	1

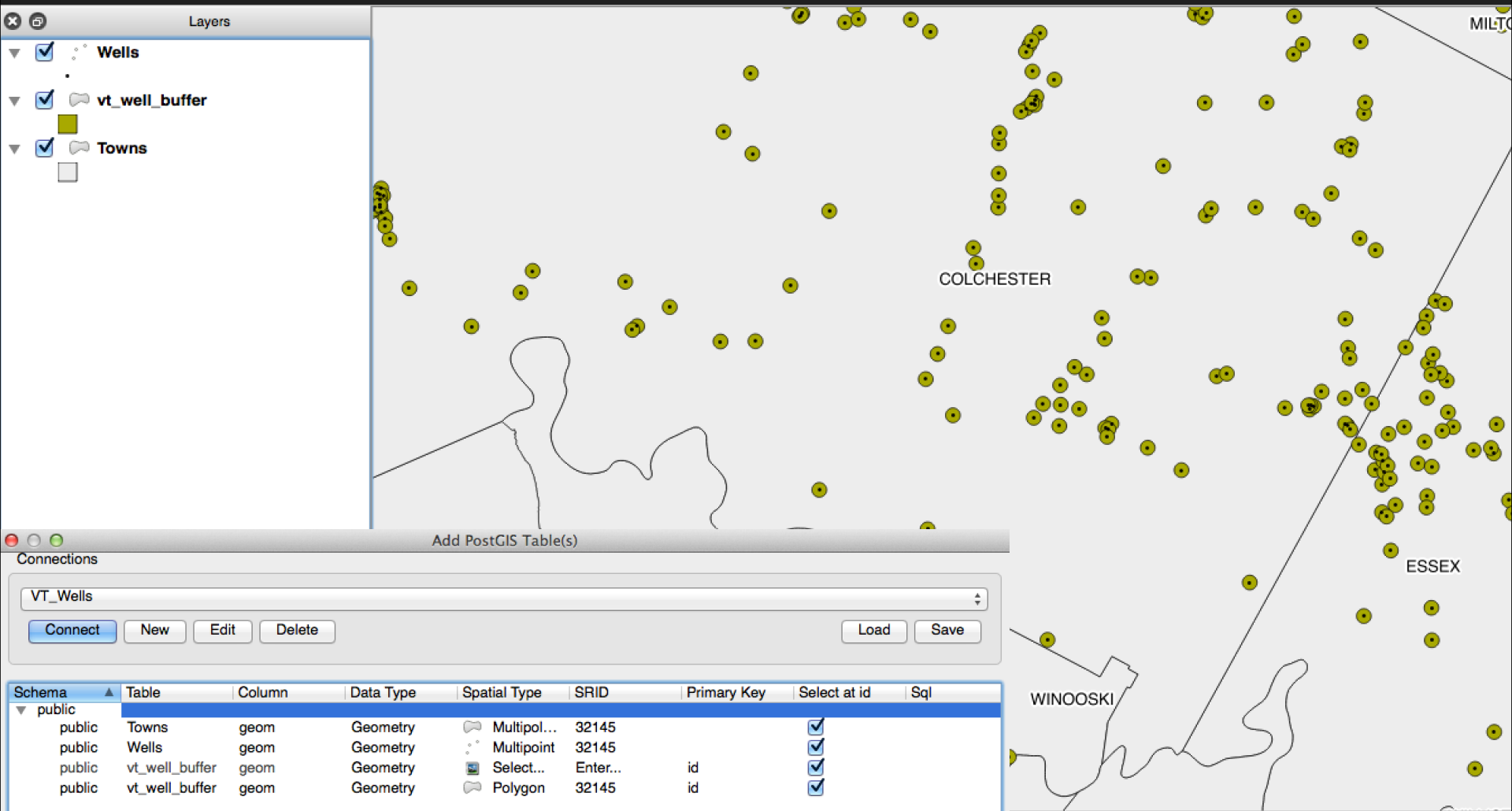


OK.

UnixLn 3, Col 47, Ch 209

18 rows.312 ms


```
CREATE VIEW vt_well_buffer AS
SELECT id, ST_BUFFER(geom, 100) AS geom
FROM public."Wells";
```



CartoDB:

http://vanhoesenj.cartodb.com/api/v2/sql?q=SELECT * FROM gsa

PGSQL2SHP:

```
pgsql2shp -f <path to new shapefile> -g <geometry column name> \  
-h <hostname> -U <username> "<query>"
```

RASTER2PGSQL:

```
raster2pgsql raster_options_go_here raster_file  
someschema.sometable > out.sql
```

SPIT or Database Manager:

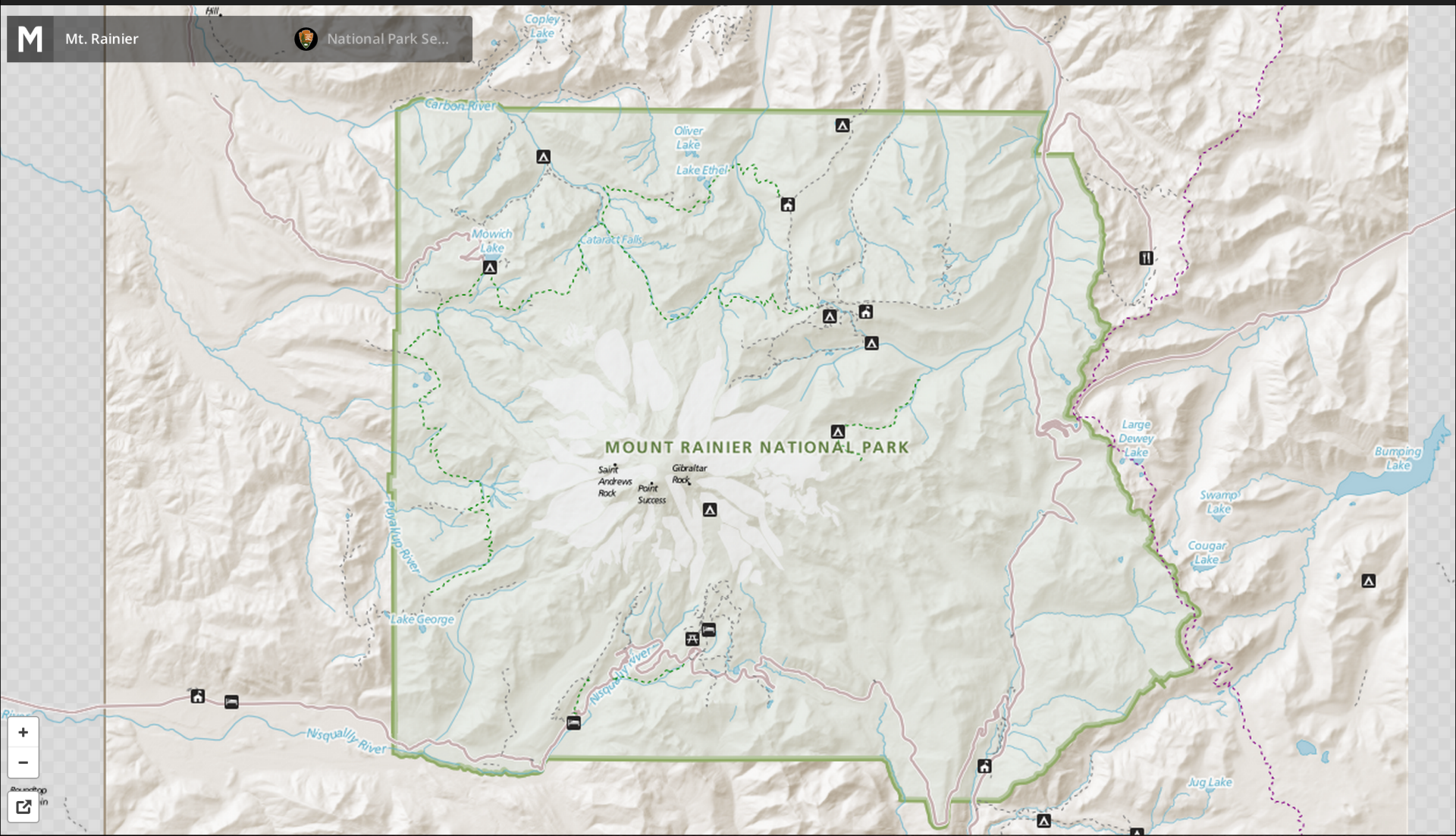
Export directly

M

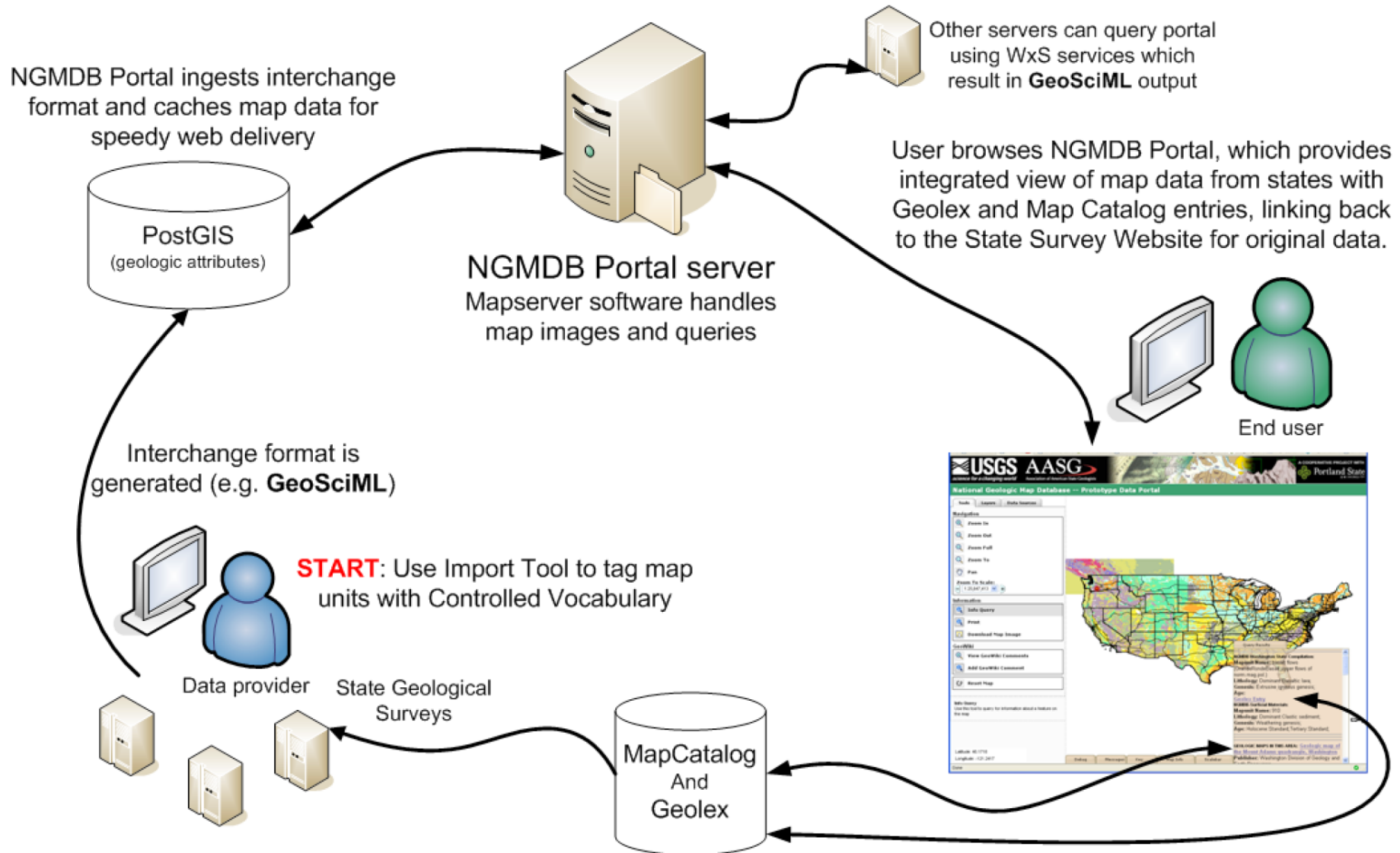
Mt. Rainier



National Park Se...



NGMDB Data Portal (Phase 3)



Code Example 1: PostGIS SQL query to produce GeoSciML-portrayal view for map unit polygons.

```
1  CREATE TABLE sde.geologicunitview As
2  SELECT
3  mup.objectid as objectid,
4  mup.mup_id AS identifier,
5  dmυ.description AS name,
6  mup.notes AS description,
7  'Geologic Unit'::text AS "geologicUnitType",
8  'Not Specified'::text AS rank,
9  polyextattr.lith6name AS lithology,
10 dmυ.age AS "geologicHistory",
11 (datasources.source::text || ' '::text) || datasources.notes AS source,
12 'http://.../cgi/geologicunittype/0008'::text AS "geologicUnitType_uri",
13 polyextattr.lithuri AS "representativeLithology_uri",
14 polyextattr.ageuri AS "representativeAge_uri",
15 mapunitages.ageyoungerterm AS "representativeLowerAge_uri",
16 mapunitages.ageolderterm AS "representativeUpperAge_uri",
17 'http://www.opengis.net/def/nil/OGC/0/missing'::text AS specification_uri,
18 'http://catalog.usgin.org/geoportal/...'::text AS metadata_uri,
19 mup.mapunit AS "genericSymbolizer",
20 shape::geometry as shape
21 FROM mapunitpolys AS mup
22 LEFT JOIN polyextattr ON mup.mapunitpolys_id = polyextattr.ownerid
23 LEFT JOIN datasources ON mup.datasourceid = datasources.datasources_id
24 LEFT JOIN descriptionofmapunits as dmυ ON mup.mapunit = dmυ.mapunit
25 LEFT JOIN mapunitages ON mup.mapunit = mapunitages.mapunit;
```


D'OYLY CARTE'S
OPERA CO. IN

UTOPIA, LIMITED

GILBERT & SULLIVAN'S
NEW OPERA



QUESTIONS?