Performing Table Joins

QGIS Tutorials and Tips

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Установление связей между таблицами

Не каждый набор данных, который вы хотите использовать, поставляется как shape-файл или в пространственном формате. Часто данные будут получены в виде таблицы или листа Excel, и вам нужно будет связать его с существующими пространственными данными для использования в анализе. Эта операция известна как ■■■■■■■■■■ ■■■■■■, и этот урок покажет, как осуществлять соединения таблиц в QGIS.

Обзор задачи

We will use a shapefile of census tracts for California and population data table from US Census Bureau to create a population map for california.

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- создавать файлы *.csvt* с указанием типов данных в столбцах CSV-файла.
- Загружать CSV-файлы, не содержащие данных о геометрии, в QGIS.

Получение данных

US Census Bureau has various spatial extracts from the MAF/TIGER database. You can query and download census tracts shapefile for California.

Americal FactFinder is a repository of all census data for the US. You can use **Advanced Search** and query for the **Topic - Total Population** and **Geographies - All Census Tracts in California** to create a custom CSV and download it. This tutorial uses **Total Population 2010 Census Summary File 1** data.

Источники данных: [TIGER] [USCENSUS]

Методика

1. We will first load the census tracts shapefile. Go to Layer › Add Vector Layer.

2. Browse to the downloaded zip file **tl_2013_06_tract.zip** and select it. QGIS can open zip files directly so no need to uncompress it first.

3. Select the **tl_2013_06_tract.shp** layer and click OK.

4. You will see the census tracts loaded into QGIS.

5. Right-click on the layer and select Open Attribute Table.

6. Examine the attributes of the tracts shapefile. To join a table with this shapefile, we need a unique and common attribute for each feature. In this case, the GEOID field is a unique identifier for each tract and can be used to **link** this shapefile with any other table containing the same ID.

	STATEFP ▽	COUNTYFP	TRACTCE	GEOID	NAME	NAMELSAD	MTFCC
0	06	001	442700	06001442700	4427	Census Tract 44...	G5020
1	06	001	442800	06001442800	4428	Census Tract 44...	G5020
2	06	037	204920	06037204920	2049.20	Census Tract 20...	G5020
3	06	037	205110	06037205110	2051.10	Census Tract 20...	G5020
4	06	037	205120	06037205120	2051.20	Census Tract 20...	G5020
5	06	037	206010	06037206010	2060.10	Census Tract 20...	G5020
6	06	037	206020	06037206020	2060.20	Census Tract 20...	G5020
7	06	037	206050	06037206050	2060.50	Census Tract 20...	G5020
8	06	037	207400	06037207400	2074	Census Tract 20...	G5020
9	06	001	442900	06001442900	4429	Census Tract 44...	G5020
10	06	037	192410	06037192410	1924.10	Census Tract 19...	G5020
11	06	037	192510	06037192510	1925.10	Census Tract 19...	G5020
12	06	037	192520	06037192520	1925.20	Census Tract 19...	G5020
13	06	037	192610	06037192610	1926.10	Census Tract 19...	G5020
14	06	037	192700	06037192700	1927	Census Tract 19...	G5020
15	06	037	194500	06037194500	1945	Census Tract 19...	G5020
16	06	037	195100	06037195100	1951	Census Tract 19...	G5020
17	06	037	195300	06037195300	1953	Census Tract 19...	G5020
18	06	001	443001	06001443001	4430.01	Census Tract 44...	G5020
19	06	001	443002	06001443002	4430.02	Census Tract 44...	G5020
20	06	001	443102	06001443102	4431.02	Census Tract 44...	G5020
21	06	001	443301	06001443301	4433.01	Census Tract 44	G5020

Attribute table - tl_2013_06_tract :: Features total: 8057, filtered: 8057, selected: 0

Show All Features

7. Open the CSV file ***ca_tracts_pop.csv*** in a text editor. You will notice that each row of the file contains information about a tract along with the unique identifier we saw in the previous step. Note that this field is called GEO.id2 in the CSV. You will also note that the D001 column has population value for each of the census tract.

```
ca_tracts_pop.csv - Notepad

File  Edit  Format  View  Help

POPGROUP.id,POPGROUP.display-label,GEO.id,GEO.id2,GEO.display-label,D001
001,Total population,1400000US06001400100,06001400100,"Census Tract 4001, Alameda County, California",2937
001,Total population,1400000US06001400200,06001400200,"Census Tract 4002, Alameda County, California",1974
001,Total population,1400000US06001400300,06001400300,"Census Tract 4003, Alameda County, California",4865
001,Total population,1400000US06001400400,06001400400,"Census Tract 4004, Alameda County, California",3703
001,Total population,1400000US06001400500,06001400500,"Census Tract 4005, Alameda County, California",3517
001,Total population,1400000US06001400600,06001400600,"Census Tract 4006, Alameda County, California",1571
001,Total population,1400000US06001400700,06001400700,"Census Tract 4007, Alameda County, California",4206
001,Total population,1400000US06001400800,06001400800,"Census Tract 4008, Alameda County, California",3594
001,Total population,1400000US06001400900,06001400900,"Census Tract 4009, Alameda County, California",2302
001,Total population,1400000US06001401000,06001401000,"Census Tract 4010, Alameda County, California",5678
001,Total population,1400000US06001401100,06001401100,"Census Tract 4011, Alameda County, California",4156
001,Total population,1400000US06001401200,06001401200,"Census Tract 4012, Alameda County, California",2416
001,Total population,1400000US06001401300,06001401300,"Census Tract 4013, Alameda County, California",3528
001,Total population,1400000US06001401400,06001401400,"Census Tract 4014, Alameda County, California",4314
001,Total population,1400000US06001401500,06001401500,"Census Tract 4015, Alameda County, California",2630
001,Total population,1400000US06001401600,06001401600,"Census Tract 4016, Alameda County, California",2163
001,Total population,1400000US06001401700,06001401700,"Census Tract 4017, Alameda County, California",2667
001,Total population,1400000US06001401800,06001401800,"Census Tract 4018, Alameda County, California",1703
001,Total population,1400000US06001402200,06001402200,"Census Tract 4022, Alameda County, California",2385
001,Total population,1400000US06001402400,06001402400,"Census Tract 4024, Alameda County, California",2351
001,Total population,1400000US06001402500,06001402500,"Census Tract 4025, Alameda County, California",1784
001,Total population,1400000US06001402600,06001402600,"Census Tract 4026, Alameda County, California",1151
001,Total population,1400000US06001402700,06001402700,"Census Tract 4027, Alameda County, California",1569
001,Total population,1400000US06001402800,06001402800,"Census Tract 4028, Alameda County, California",3345
001,Total population,1400000US06001402900,06001402900,"Census Tract 4029, Alameda County, California",1434
001,Total population,1400000US06001403000,06001403000,"Census Tract 4030, Alameda County, California",2788
001,Total population,1400000US06001403100,06001403100,"Census Tract 4031, Alameda County, California",2238

                                                                               Ln 1, Col 1
```

8. We could import this csv file without any further action and it would be imported. But, the default type of each column would be a String (text). That is ok except for the *D001* field which contains numbers for the population. Having those imported as text would not allow us to run any mathematical operations on this column. To tell QGIS to import the field as a number, we need to create a *sidecar* file with a *.csvt* extension. This file will have only 1 row specifying data types for each column. Save this file as *ca_tracts_pop.csvt* in the same directory as the original *.csv* file. You can also *download the csvt file from here.*

```
"String", "String", "String", "String", "String", "Integer"
```
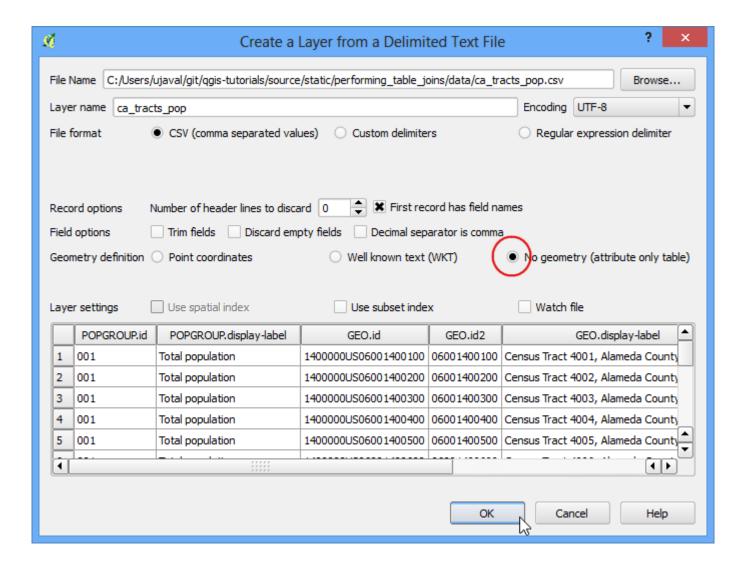
Ln 1, Col 1

9. Now we are ready to import the CSV file to QGIS. Go to Layer › Add Delimited Text Layer.

10. Browse to the folder containing the CSV file and select it. Make sure you have selected File format as CSV (comma separated values). Since we are importing this as a table, we must specify that our file contains no geometry. Select the No geometry (attribute only table) option. Click OK.

11. CSV-файл будет импортирован в QGIS как таблица.

12. Select the *tl_2013_06_tract* layer. Right-click on it and select Properties.

13. In the Layer Properties dialog, select the Joins tab. Click on the **+** button at the bottom to create a new table join.

14. In the Add vector join dialog, select **ca_tracts_pop** as the Join layer. Next we have to select the field with unique ids in both the shapefile and the CSV. Select **GEO.id2** and **GEOID** as the Join field and Target field respectively. Click OK.

15. Close the Layer Properties dialog and return to the main QGIS window. At this point, the fields from the CSV file are joined with the shapefile. Right-click on the **tl_2013_06_tract** layer and select Open Attribute Table.

16. You can now see a new set of fields, including ca_tracts_pop_D001 field added to each feature. Now you have access to the population value of each tract from the CSV file. Close the attribute table and return to the main QGIS window.

	INTPTLAT	INTPTLON	icts_pop_POPGRC	op_POPGROUP.di	tracts_pop_GEC	pop_GEQ.disp	ca_tracts_pop_D001
0	+37.5371514	-122.0081094	001	Total population	1400000US06...	Census Tra...	2873
1	+37.5293619	-121.9931002	001	Total population	1400000US06...	Census Tra...	2816
2	+34.0175004	-118.1974975	001	Total population	1400000US06...	Census Tra...	2598
3	+34.0245059	-118.2142985	001	Total population	1400000US06...	Census Tra...	3766
4	+34.0187546	-118.2117956	001	Total population	1400000US06...	Census Tra...	3618
5	+34.0682177	-118.2320356	001	Total population	1400000US06...	Census Tra...	3127
6	+34.0571230	-118.2311021	001	Total population	1400000US06...	Census Tra...	7883
7	+34.0299036	-118.2244531	001	Total population	1400000US06...	Census Tra...	2146
8	+34.0561941	-118.2466502	001	Total population	1400000US06...	Census Tra...	1363
9	+37.5184093	-121.9748369	001	Total population	1400000US06...	Census Tra...	7194
10	+34.0798577	-118.3181008	001	Total population	1400000US06...	Census Tra...	3628
11	+34.0798690	-118.3068568	001	Total population	1400000US06...	Census Tra...	3670
12	+34.0799255	-118.3024972	001	Total population	1400000US06...	Census Tra...	5067
13	+34.0813650	-118.2961539	001	Total population	1400000US06...	Census Tra...	4389
14	+34.0800134	-118.2881064	001	Total population	1400000US06...	Census Tra...	3513
15	+34.0781753	-118.3695958	001	Total population	1400000US06...	Census Tra...	2037
16	+34.1022274	-118.2669741	001	Total population	1400000US06...	Census Tra...	4717
17	+34.0992506	-118.2836893	001	Total population	1400000US06...	Census Tra...	3203
18	+37.5184218	-121.9515237	001	Total population	1400000US06...	Census Tra...	2917
19	+37.5168344	-121.9605916	001	Total population	1400000US06...	Census Tra...	5918
20	+37.5071943	-121.9271475	001	Total population	1400000US06...	Census Tra...	4611
21	+37.4707325	-121.9129556	001	Total population	1400000US06	Census Tra	4074

Show All Features

17. Right-click the *tl_2013_06_tract* layer and select Properties.

18. Select the Style tab. Select the Graduated from the drop-down menu. As we are looking to create a population map, we want to assign different color to each census tract feature based on the population count. Select ca_tracts_pop_D001 as the Column. Select a color ramp of your liking from the Color ramp drop-down. In the Mode, select Quantile (Equal Count). Next click Classify. You will see a different color assigned to certain population ranges. Click OK.

19. You will now see a nice visualization of the census tracts as styled using population values. Use the Zoom in tool to select a smaller area from the layer.

20. You have a detailed and accurate population map of California. You can use the same technique to create maps based on variety of census data.