# Group Stats Plugin for Calculate The Objects

#### **Objectives:**

- To be able to demonstrate how to install a plugin for calculate number of object in QGIS
- To be able to operate the Group Stats plugin for calculate number of OSM Object

The calculation of the quantity of data can be an indicator of the achievement of mapping projects that can be poured into a mapping report. The process of calculating the quantity of OSM data can be done by installing the plugin group stats in QGIS for free, this plugin can use to count the number of objects based on categories.

### I. Group Stats Installation

• If you haven't the QGIS application, you can download it in this link and install the QGIS.

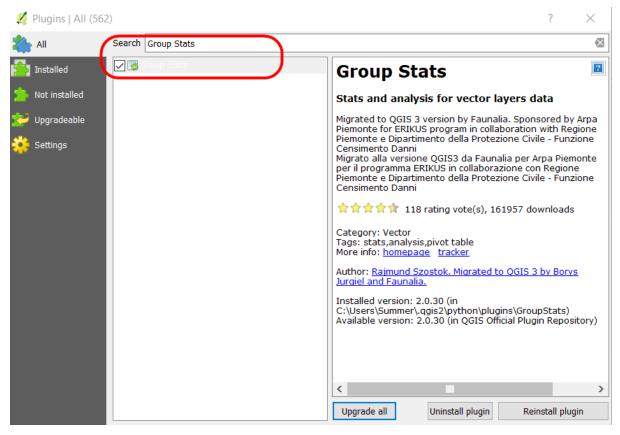
http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86.exe for Windows 32 bit and http://download.osgeo.org/qgis/win64/QGIS-OSGeo4W-2.14.22-1-Setup-x86\_64.exe for Windows 64 bit.

• Open QGIS and ensure the internet connection is working. Click on Plugins Menu → Manage and Install Plugins

Plug	ins	Vector	Raster	Database	Web	Pro	cessing	
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**Plugins Menu Interface** 

• Type Group Stats in the Search box and click on Install Plugin



Install the plugin

• If the installation has finished, the plugin will show up in Vector Menu → GroupStats

Vector	Raster	Database	Web	Processing	Help	
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GroupStats Interface

#### II. Calculate OSM Objects using Group Stats

We can overlay the administrative boundaries and the infrastructures to get the calculate of data quantity. The results of the calculation can be used to create a monthly report and monitory the mapping timeline. Before we starting to calculate the objects, we have to prepare the data in the shapefile format.

We can use the data form PDC InaWARE project in Semarang City in this chapter, getting the administrative boundary data in this link https://openstreetmap.id/data-semarang/ and the infrastructures data in https://export.hotosm.org/en/v3/exports (follow this chapter **04.Using YAML** to the instructions). The list of the objects in the shapefile:

## • Public Facilities: Points and Polygons

- 1. All objects in amenity=\*
- 2. Electrical Facility (power=\*)
- 3. Park (leisure=\*)
- 4. Government Office (office=\*)
- 5. Supermarket (shop=supermarket)
- highways: Lines

highway=\*

The next step we will start to calculate the objects:

# a. Preparing the Data

 Open the layer in QGIS with click on Add Vector Layer → Browse or click Layer Menu → Add Layer → Add Vector Layer → Browse.

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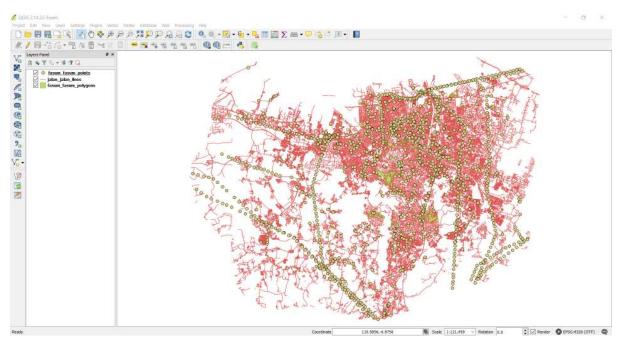
Add Vector Layer

• Choose your directory that the objects file is saved  $\rightarrow$  Select All  $\rightarrow$  Open  $\rightarrow$  Open

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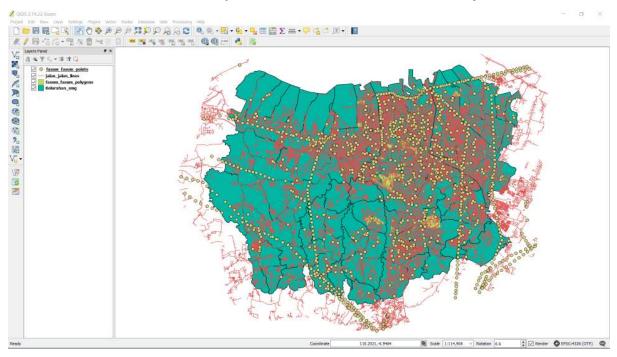
Open shapefile from directory

• The layers will appear on map canvas and Layers Panel



The Objects layer view on the map canvas

• Add the administrative boundary to QGIS with click on the Add Vector Layer



The layer view on the map canvas

## b. Merge the Objects Layer and Administrative Boundary

Merge the layer between the objects and administrative boundary so that the objects have a new column from the administrative boundary. Click Menu Vector → Geoprocessing Tool → Intersect to merge the layer. In section, input vector layer selects the object layer with the Intersect layer (administrative boundary layer). Choose Browse to save the file output shapefile in your directory, and click OK.

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Intersect layer

• The results will appear in your map canvas as a new layer. We can get the details of the attribute data form "fasum\_point\_admin" layer with right-click on the layer and click on Open Attribute Table. We found at the column name\_2 the name of a village in each object.

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The attribute table of intersecting result

• We will repeat the process on the highways layer and the polygon public facilities layer. The intersecting results will be three-layer on the QGIS.

- Open the attribute table in each layer and check the column that it is a reference to calculate the OSM data. The list of the column in attribute table:
- 1. Point public facilities = amenity, power, office dan supermarket
- 2. Polygon public facilities = amenity, power, office, supermarket, dan leisure
- 3. highways = highway

### c. Calculate the Objects using Group Stats Plugin

The mapping results are points, lines, and polygons so that we can calculate with a different formula in Group Stats plugin based on the type of data. OSM data in points and polygons will be calculated with the formula "**count**" that calculating the number of an attribute in the column. Although, OSM data in lines will be calculated with the formula "**sum**", that calculating the number of length segments.

### 1. The Calculating Points and Polygons

• Open the plugin with Menu Vector  $\rightarrow$  Group Stats  $\rightarrow$  GroupStats

	Vector	Raster	Database	Web	Proce	essing	Help	
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Group Stats

- Follow the instructions as below:
  - 1. Layers (1)= show the layer will be calculated. Fields = an automatic show the column in attribute table that chooses
  - 2. Filter (2) = use to show objects only in specific administrative boundary
  - 3. **Columns** (3) = use to become column on the table, fill the column on the Fields, with a click and move the Columns box.
  - 4. **Rows** (4) = use to become a row in the table, fill the column on the Fields, with a click and move the Row box.
  - 5. Value (5)= use to select the formula
  - 6. Click on **Calculate** (6) to starting the calculation

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Step by step the Group Stats

• We will use the filter function to select the objects only in specific sub-district. Click on "fasum\_point\_admin", so that the data only show for once sub-districts. Filter data on the "fasum\_point\_admin" layer, and click the Filter in Group Stats. The filter window will appear.

💋 Query Builder

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Filter data

 We will move the result table in group stats to other spreadsheet applications such as Ms.Excel or Google Sheets. So we can change the visual data to become a graph and a diagram. To start the process click on Data → Copy all to clipboard.

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Copy and paste the attribute table

- Open the Microsoft Excel or Google Sheets to move the results table Group Stats.
- We can do the same instructions to calculate the other objects, see the example results from PDC Semarang City in this link http://tinyurl.com/kuantitas-data.

# 2. Calculate the Lines Object with Calculation Length Segments.

The Calculation a type of lines different with points and polygon. If we calculate the length segments of highways, the shapefile will be changed in Universal Transverse Mercator (UTM) coordinate system. The steps to calculate the length of the highways:

## a. Change the Coordinate System

 Right-click on highways layer → Save as → choose the Format ESRI Shapefile → Save as in your directory → CRS choose the reference system on your UTM area.

💋 Save vector layer as		? ×
Format ESRI Shapefile		•
Save as Semarang/Data Latihan/QGIS	/Admin Poligon/jalan_admin_UTM.s	hp Browse
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Save as with different CRS

- If you give the checkmark on the Add saved the file to map, the result will show up in the map canvas and Layers Panel.
- b. Create the New Column to Calculation Length of the highways
  - Then right-click on the Layers "Jalan\_Admin\_UTM" → Open Attribute Table. Click on the Toggle editing mode to activate the attribute toolbar.

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Toolbar Toggle editing mode

• To add a new column, click on the New Field in the toolbar.

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Toolbar New Field

- There are the filled form Add field window
- 1. Name = Title of the column (a maximum of 10 characters)
- 2. **Type** = Type of data that you need in the fill of the table. Select the Decimal number (real) to view the length of the segments
- 3. **Provider type double** = The length shows the maximum number of columns and precision shows the number of the decimal in behind comma.
- 4. Click OK

🕺 Add field	1	?	×
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Add field setting

c. Calculation the Length (meter) with Field Calculator

- To start the process click on Open field calculator
- The settings in the Open field calculator:

- 1. We can put the checkmark in **Update existing field** to update the existing column.
- 2. Choose the column that will be updated
- 3. We can type the "length" to calculate the length of the highway with the formula.
- Double-click on Geometry → \$ length is a formula to calculate the length of segments. After we clicked the formula, \$length will appear in the Expression box in the right panel.
   Click OK
- 💋 Field calculator ? × Only update 0 selected features 1 Create a new field Update existing field Create virtual field 2 Output field name Panjang\_Jl Output field type Whole number (integer) \* Output field length 10 Precision 0 Expression **Function Editor** 3 + \* ^ '\n' length 63 function \$length = 11 ) ( ✓ Geometry Returns the length of a \$length 4 linestring. If you need the \$length length of a border of a ✓ String polygon, use \$perimeter length instead. The length Recent (fieldcalc) calculated by this function \$length respects both the current \$length project's ellipsoid setting and distance unit settings. Eg, if an ellipsoid has been set for the project then the calculated length will be ellipsoidal, and if no ellipsoid is set then the calculated length will be planimetric. Syntax \$length Examples \$length → 42.4711 < > Output preview: 383.568702290216 5 OK Cancel Help

The setting of Field Calculator

• The results will be displayed in the last column.

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1         prog.tom         good         psd         Mail         MDT_MANAME         Psd         Main         MDT_MANA         Psd         Main         MAIL         MDT_MANAME         Psd         Main         MDT_MANA         Psd         Main         MDT_MANA         Psd         Main         Main         Main         MDT_MANA         Main         Main         Main         Main         Main         Main         MAIL         MDT_MANAME         Main		1	paving_stones	good	yes	yes	10.01	HOT_INAWAR 7		relation/8103	relation/B103	7	administrative	Semarang	Semarang Ti	Jawa Tengah	Rejornalya	HOT_INA	1.049326586
1         parking, loss         gale         park		1	paving_stones	good	yes	yes	38.82	HOT_INAWAR 7		relation/8094	relation/8094	7	administrative	Semarang	Semarang Te	Jawa Tengah	Purwodinatan	HOT_INA	40.32721403
1         parking, times         good         ref         Addit         MOT_MANNAR         2         within fulling         2         administration         Semaraging         Semaraging </td <td></td> <td>1</td> <td>paving_stones</td> <td>good</td> <td>yes</td> <td>yes</td> <td>haal.</td> <td>HOT_INAWAR 6</td> <td></td> <td>relation/8111</td> <td>relation/B111</td> <td>2</td> <td>administrative</td> <td>Semarang</td> <td>Semarang Ut</td> <td>Jawa Tengah</td> <td>Tanjungmas</td> <td>HOT_INA</td> <td>0.954416595</td>		1	paving_stones	good	yes	yes	haal.	HOT_INAWAR 6		relation/8111	relation/B111	2	administrative	Semarang	Semarang Ut	Jawa Tengah	Tanjungmas	HOT_INA	0.954416595
1         prog.tom         good         ref		1	paving_stones	good	yes	yes	10.01	HOT_INAWAR 6		relation/8094	relation/8094	7	administrative	Semarang	Semarang Te	Jawa Tengah	Purwodinatan	HOT_INA	185.9851813
1         aphat         ged         yea         Add         HOT_JAAAAAAA         ethon (HSSL         ethon (HSSL         2         administrative         Semaragi         Semaragi <td></td> <td>1</td> <td>paving_stones</td> <td>good</td> <td>yes :</td> <td>yes</td> <td>MML</td> <td>HOT_INAWAR 7</td> <td></td> <td>relation/B111</td> <td>relation/Biii</td> <td>7</td> <td>administrative</td> <td>Semarang</td> <td>Semarang Ut</td> <td>Jawa Tengah</td> <td>Tanjungmas .</td> <td>HOT_INA</td> <td>541.9072143</td>		1	paving_stones	good	yes :	yes	MML	HOT_INAWAR 7		relation/B111	relation/Biii	7	administrative	Semarang	Semarang Ut	Jawa Tengah	Tanjungmas .	HOT_INA	541.9072143
1         aphat         geod         yes         Mail         Montpublies         etabory/Mosta		1	paving_stones	900d	yes	yes	10.011	HOT_INAWA8 7		relation/8103	relation/8103	7	administrative	Semarang	Semarang Ut	Jawa Tengah	Bandarharjo	HOT_INA	0.845853872
1         spikt         god         spik         oo         ALI         HOT_JAWARE         spik         spikt         Semarage         Sema		1	asphak	good	yes	yes	ALLI	HOT_INAWAR 4		relation/8055	relation/8055	7	administrative	Semarang	Semarang Ti	Jawa Tengah	Sarirejo	HOT_DA	4.324274811
1         applet         good         yea         no         ALL         NoT_JAVAVEL         and         indication (Sintarian)         Semarange         Jamma fan         <		1	asphalt	good	yes	yes	atiti	HOT_INAWAR 4		relation/8058	relation/8058	7	administrative	Semarang	Semarang Te	Jatwa Tengah	Jagalan	HOT_INA	271.7814708
1         aphth         gold         yes         Add         w0T_JMAWAR         6         relation (H12A)         relation (H12A)         7         Mainrashtak         Semarang Ta         Jana Tanga         Nation         NoT_JMA         NoT_JMAWAR         6         relation (H12A)         relation (H12A)         7         Mainrashtak         Semarang Ta         Jana Tanga         Nation         NoT_JMA         Mainrashtak         Nation         NoT_JMA         Mainrashtak         Semarang Ta         Jana Tanga         Nation         NoT_JMA         Mainrashtak         Nation         NoT_JMA         Nation         NoT_JMA         Nation         Nation         NoT_JMA         Nation         Natintak         Nation         Natio		1	asphalt	good	y65	no	neai	HOT_INAWAR 4		relation/8037	relation/B037	7	administrative	Semarang	Semarang Te	Jawa Tengah	Brumbungan	HOT_INA	5.129662209
1         asplak         godd         yea         Mail         Mot_Low/WAR_6         exhton (#211.         relation (#211.         optimization         sommary 6         Jama Tangah         for         7         administration         Sommary 6         Jama Tangah         for		1	asphalt	good	yes	na	38.82	HOT_INAWAR., 4		relation/8058	relation/8058	7	administrative	Semarang	Semarang Ts	Jawa Tengah	Jagalan	HOT_INA	528.4129127
1         Sphah         good         res         Mail         NOT_INVUKE.         6         relation(B124         relation(B124 <threlation(b124< th="">         &lt;</threlation(b124<>		1	asphalt	good	yes	yes	NULL.	HOT_INAWAR 6		relation/B174	relation/B174	2	administrative	Semarang	Semarang Te	Jawa Tengah	Pekunden	HOT_INA	48.74032244
1         Spekt         yes         yes         Not         INCT_INVERVE_6         relation(NDM_r relation(ND		1	asphalt	good	yas	yes	10.01	HOT_INAWAR 6		relation/8211	relation/8211	2	administrative	Seniarang	Semarang Te	Jawa Tengah	Karangkidul	HOT_INA	7.443486088
1 asphalt good yes yes NULL HOT_INAUMAR		1	asphak	good	yes	yes	MML	HOT_INAWAR 6		relation/8174	relation/B174	7	administrative	Semarang	Semarang Te	Jawa Tengah	Pekundan	HOT_INA	1202.319562
		1	asphalt	good	yes	yes	nuu	HOT_INAWAR 6		relation/8034	relation/8034	7	administrative	Semarang	Sensarang Ti	Jawa Tengah	Karangturi	HOT_INA	3.240766399
2 seebs international yes yet all HOT ToNARS 7 relation(RM2 relation(RM2 7 setting Semanon Semanon Set Two TonAs Relation HOT fold \$ 3		1	asphak	good	yes	yes	10.02	HOT_INAWAR 6		relation/8211	relation/8211	7	administrative	Semarang	Semarang Te	Jawa Tengah	Karangkidul	HOT_DA	347.1390634
<ul> <li>approximation provide the second secon</li></ul>		2	asphalt	intermediate	yes	yes	atiti	HOT_INAWAR 7		relation/8067	relation/8087	7	administrative	Semarang	Semarang Sel.	Jawa Tengah	Pleburan	HOT_INA	8.747682729

#### The length of highways

• Save your edit with Save Edits in the toolbar. To finish the process click Toggle Editing.

🧕 jalan_ad	min_UTM	:: Fe	atures to	tal: 3	480	5, fil	tere	d: 34	805,	selec	ted:	0
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Save E	dits (Ctrl+9	5)	]									

Save edits

d. Calculation the length of highways based on the type of highways with Group Stats

- Open Group Stats click on the Menu Vector → Group Stats → Group Stats.
  We can use the "sum" and Length formula to calculate the number of length on the Value box

	1	2	3	4	5	6	7	8	Control panel
^	name_2	Candi	Jatingaleh	Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal	Layers
2	highway								jalan_admin_UTM
3	living_street	5973.71	2965.41	6561.5	561.991	4432.54	3374.79	2565.41	layer
4	motorway		1126.45	28 <mark>0.444</mark>		181.662			motorcycle
5	path		14.6127				599.21 <mark>5</mark>	26.2861	ame
6	pedestrian						141.306	342.868	name_2 oneway
7	primary	783.997	532. <mark>9</mark> 23	356.633	834.858	327.099	1125.32		📄 osm_id
8	residential	9131.5	12550.4	20747.7	6067.3	14608.5	16158.2	9767.19	Panjang_JI
9	secondary	1038.14	9.72571	863. <mark>676</mark>	1312.3	3.3838	1492.09	1528.76	- cmoothnace
10	service	<mark>494.216</mark>	3680.79	228.9 <mark>3</mark> 2	253.1 <mark>4</mark> 3	556.516	528.045	848.201	Filter
11	tertiary	3.0196	3043. <mark>1</mark> 1	1560.75	3.02748	2002.74	1.99649	921.379	name_2
12	trunk		1380.6		728.414			1057.4	

The setting of length segments

• If we want to calculate based on the administrative boundary, we can use the filter function in the Group Stats plugin. Click on Filter and follow the instructions.

💋 Query Builder

? ×

			Values		
ef		~	Banyumanik		~
evacuation			Candisari 4		
helter_ty			Gajah Mungkur		
vater_sour			Gayamsari		
itchen_fa			Genuk		
oilet_fac			Gunung Pati		
oilets_nu			Mijen		
d			Ngaliyan		
Did			Pedurungan		
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oundary			Semarang Selatar	ı	
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		~	Use unfiltered I	ayer	
<= >	>= !=	ILIK	E AND	OR	NOT
ovider specific filter	expression				
	='Candisari				

Filter based on subdistricts

• As explained before, we can move the table to another spreadsheet to create a graph. Click on the Data → Copy all to clipboard.

	Group	Ctata
	UNCOLLE	) Stats
~ 6	oroup	- Dicardo

Data	Features	Window	Help						
	Copy all to cl			Γ	4	5	6	7	8
	Copy selecter Save all to C			eh	Jomblang	Kaliwiru	Karanganyar Gunung	Tegalsari	Wonotingal
	Save selected	to CSV	file						
3	living_street	5973.71	2965.4	41	6561.5	561.991	4432.54	3374.79	2565.41
4	motorway		1126.4	45	280.444		181.662		
5	path		14.612	27				599.215	26.2861
6	pedestrian							141.306	342.868
7	primary	783.997	532.92	23	356.633	834.858	327.099	1125.32	
8	residential	9131.5	12550	).4	20747.7	6067.3	14608.5	16158.2	9767.19
9	secondary	1038.14	9.725	71	863.676	1312.3	3.3838	1492.09	1528.76
10	service	494.216	3680.	79	228.932	253.143	556.516	528.045	848.201
11	tertiary	3.0196	3043.1	11	1560.75	3.02748	2002.74	1.99649	921.379
12	trunk		1380	.6		728.414			1057.4

Copy all the clipboard

• Open the spreadsheet and paste the table in there.

The example table of length the highways

Type of highway	Candi	Jatingaleh	Jomblang	Kaliwiru	Karang Gunung	Tegalsari	Wonotinggal
Motorwov		1313.88	163.85		_	_	
Motorway	-		103.00	-	-	-	-
Trunk	-	1571.20	-	1602.19	-	-	-
Primary	-	1389.34	1264.54	-	206.96	-	-
Secondary	1065.13	-	24.17	2353.86	-	-	-
Tertiary	271.49	3920.71	1612.78	-	836.18	-	-
Service	500.24	2567.00	226.11	116.68	150.03	301.93	851.94
Residential	8486.45	14300.66	20972.41	5424.36	13322.03	15234.38	11635.03
Pedestrian	-	1313.88	163.85	-	-	141.93	344.38
Path	-	14.68	-	-	-	601.85	26.40
Living Street	5913.74	2841.22	6588.17	451.66	4401.59	3509.38	2576.71

• We can do the same instructions to calculate the other objects in lines, see the example results from PDC Semarang City in this link http://tinyurl.com/kuantitas-data.

## SUMMARY

We have learned about how to calculate the quantities of OSM data using the Group Stats plugin. We can use the statistic data in the report to analysis, mapping progress, and mapping achievement. If you want to create the timeline from the results based on an admin level, we can calculate the data in each village that the village survey has finished.