

Perfect Polygons in QGIS

An Introduction to the *Polygonize* Tool



Introduction

Polygons that share common boundaries should not contain overlaps or gaps. This note describes a method that in effect allows large polygons to be sliced into any number of smaller polygons, all perfectly formed without gaps or overlaps, utilizing the QGIS *Polygonize* tool.

Polygonize can take a shapefile or a KML file containing lines and convert it to polygons, saving the result as a shapefile. The method eliminates double-tracing and the need to snap abutting polygons together and can be a very efficient way of digitising complex shapes from, for example, map images and satellite imagery.

The sequence in which the lines were drawn in Google Earth can be shown by hiding them all and then making them visible one after the other, in the order in which they were traced. Note how the lines intersect, creating “tails” that extend beyond the points of intersection. The “tails” do not have to be as long as those shown, the essential requirement is that lines actually connect.

Once traced the lines were saved in a KML file (*not* a KMZ file) by right-clicking on the *folder* containing them and selecting “Save Place As...”.

Using the *Polygonize* tool

Load the KML file into QGIS (QGIS will recognise that its CRS is EPSG:4326). Set the project CRS and enable on-the-fly coordinate transformation. In this case, the CRS used for the project was EPSG:27700.

Start the Polygonizer, select the KML layer, supply a file name and location for the output shapefile and click “OK”. Then load the newly created shapefile into QGIS and examine the polygons.

Example: Tracing from raster images

Load a georeferenced raster image into QGIS, set its CRS, set the project CRS and enable on-the-fly coordinate transformation. Create a new *line* shapefile and trace lines from the image, ensuring that the lines intersect such as to permit their conversion to polygons. Save the shapefile, then use the *Polygonize* tool to convert it to a polygon shapefile.



This map shows the ammonite zones exposed at low tide on the foreshore near Kilve, in the English county of Somerset. It has relatively complicated geometry and was traced from a scanned geological survey map as lines that were subsequently polygonized. The first line drawn was a pseudo-polygon that enclosed the whole of the area of interest. This was then sliced into smaller areas using lines. Every object on the map is a polygon.

The author had previously digitized exactly the same area by tracing individual polygons and estimates that using the *Polygonize* method halved the time spent tracing the raster image, with the additional benefit of creating perfect polygons.

Tracing from OpenLayers and QuickMapServices

With an OpenLayers layer displayed on the QGIS screen, zoom to an area of interest and create a new *line* shapefile. Set the CRS of the new layer to WGS 84/World Mercator (EPSG:3395), trace the lines required and save the file. Convert the line shapefile to a polygon shapefile using the *Polygonize* tool.

In the case of QuickMapServices the images served are automatically transformed to the QGIS project CRS, which can in many cases eliminate the need to reproject the vectors traced from them.

Styling and labelling

The *Polygonize* tool does not create an attribute table with attributes suitable for labelling or styling but fortunately attributes for any purpose, including styling and labelling, can be added to a polygon shapefile quickly and simply.

Overlay the polygon shapefile with a new point shapefile created with the attributes required. Make the point layer editable, then click a point at (approximately) the centroid of each polygon, entering the attribute data for each point as it is created, as prompted. When all of the points required have been added to the point shapefile join it to the polygon shapefile using the 'Join attributes by location' tool (Vector → Data Management Tools → Join attributes by location). Select the polygon shapefile as the 'Target vector layer' and the point shapefile as the 'Join vector layer'. The resulting polygon shapefile will contain the attributes from the point shapefile, which can be used for styling and labelling.

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