# Making Vector Tiles: For Pleasure and Profit

## Summary

Vector Tiles are a great new way to serve geographic data via web maps. They provide significant improvements over traditional methods of creating web maps but are a little more complicated to set up. This tutorial explains how to use Vector Tiles for both for base maps but more importantly how to create your own vector tile layers. It also explains how to do this using comply free software and avoiding licencing or subscription fees.

## Introduction

Web maps are a great way to present your data, they allow for interactivity, and for users to zoom into their area of interest. But they have a problem with large datasets, they become slow and unresponsive. This is because you have to download all your data before it is put onto the map. The solution was to tile the data.

### Tiling – What it is and why it matters

Tiling breaks your data into many small square datasets (tiles) than can then be downloaded individually. This means that you only have to download the tiles in the area you interested in rather than the whole dataset. This both reduces the amount of data that the web server has to send to the user and reduces the amount of data the user’s computer must hold in memory.

Tiling was first implemented for raster data with each tile being a 256 x 256 pixel PNG image. It works great for basemaps and is still used by many websites today such as <https://www.openstreetmap.org/>. Tiles exist in a pyramid structure, at the top of the pyramid (zoom level 0) the whole world is a single tile. Each step down the pyramid (zoom levels 1,2,3 etc) increases the number of tiles by a factor of 4. Tile sets typically go down to about zoom level 19 at which point one tile covers an area about the size of a single building.

Raster tiles have two major limitations:

1. They are static – you can’t click on an image to get extra information or dynamically change the styling of the map.

2. They are large – while each tile is small, hosting all the tiles uses up a lot of space on your server. For example, a tile set for the UK is around 15 GB.

Due to these limitations’ raster tiles are mostly used for base maps and are served by third party services.

### Introducing Vector Tiles

Vector Tiles are a newer take on the idea of tiling, instead of many images the tiles are lots of tiny vector datasets. These vector tiles are usually smaller