

## Micro-module E: Data-visualisation

With the rapid development of computer technology, data visualization can effectively display information and improve decision-making efficiency, so it has a wide application prospect in many fields. The E module will introduce data visualization definition, source and application scope.

There are mainly three micro-modules, including the introduction of information Graphics type and chart tools, the introduction of spatial data visualization platform and methods, and the introduction of interactive map production and display methods.

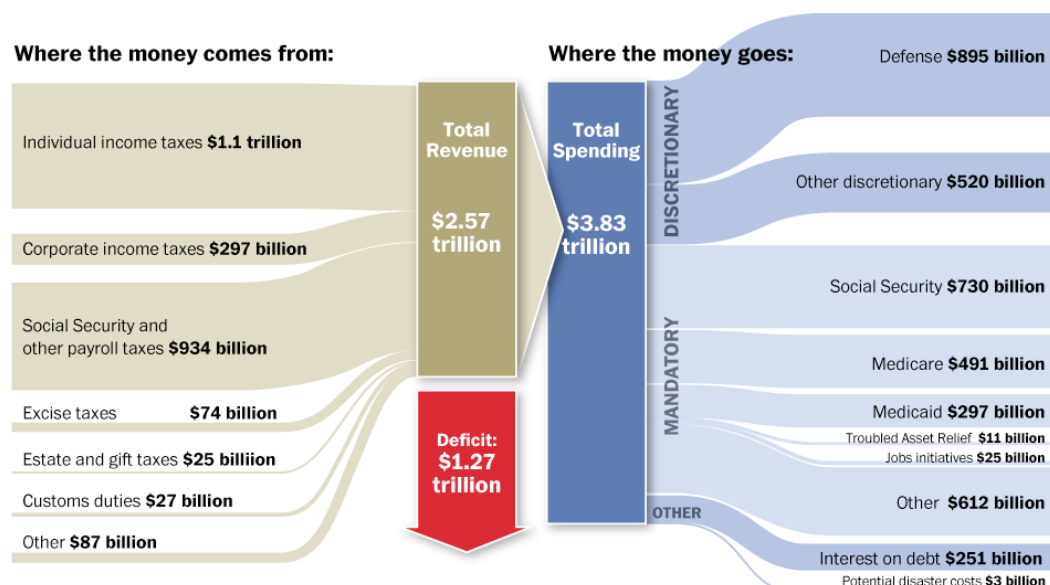
### 1. Introduction

#### 1.1 Basic information

Data visualization is the practice of presenting information through infographics, maps, and even animations to convey complex data relationships and data-driven insights in a more understandable way. Data visualization encodes digital data using dots, lines, or volumes to visually convey quantitative information. At the same time, interactive visualization allows you to use technology to dig deeper into charts and graphs and gain insights from the data.

Data visualization mainly aims to communicate information clearly and effectively by means of graphics. The concept of using graphs to understand information has been around for centuries, but advances in computer technology have made it possible to process large amounts of data quickly, and the field of data visualization traces its origins to the early 1950s, when computers were used to create the first graphical diagrams. Data visualization has become a technology combining science and art, and is widely used in business intelligence, government decision-making, public services, marketing, construction, finance, power, communications, industrial manufacturing, healthcare and other fields.

As shown in the above figure, in the US federal budget map, the flow of funds is clearly expressed in different currency flows, and the proportion of each amount.

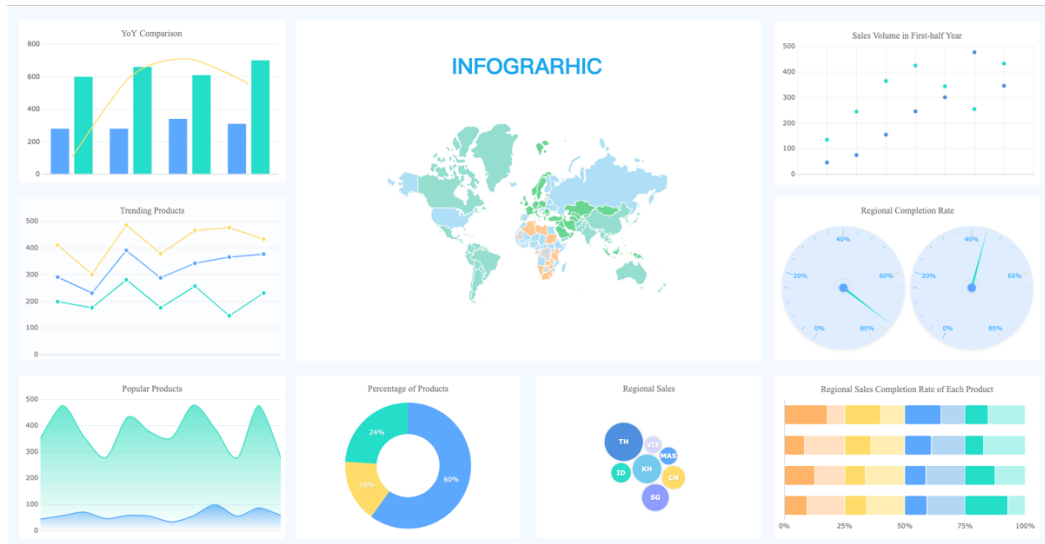


## 1.2 Application of data-visualization

Common types of data visualization mainly include Charts, Tables, Graphs, Maps and Infographics and Dashboards.

The common types of data visualization charts are: pie chart, bar chart, stacked bar chart, map, broken line chart, circle chart, bubble chart, radar chart, rectangular tree chart, curve area chart, histogram, funnel chart, word cloud, heat map, scatter chart, etc.

Some examples of graphics are shown below.



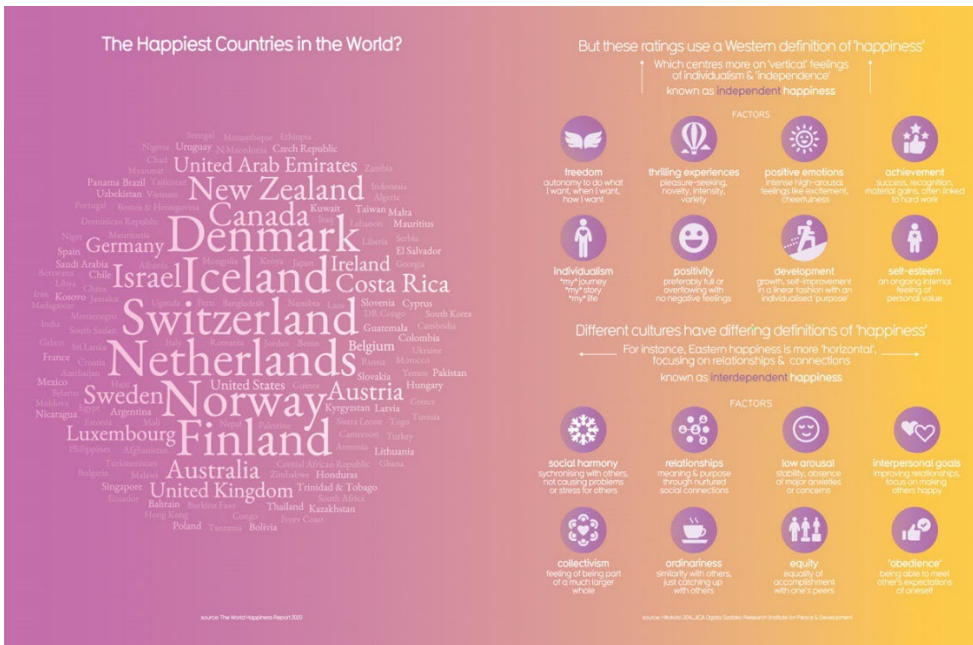
(Source: <https://www.finereport.com/en/data-visualization/data-visualization-2.html>)

In the era of information technology, data visualization provides a new way to solve urban problems and urban planning. Data visualization offers the possibility for the emergence of smart cities, data-driven analysis and other fields, and serves as a bridge between big data analysis and urban planning. Data visualization can therefore be used in the field of urban research to present historical urban data, summarize development patterns, predict future development and provide sound advice on various aspects of urban transport, environment, population and culture. In the planning process, data visualization can facilitate public participation and improve the efficiency of the decision-making process.

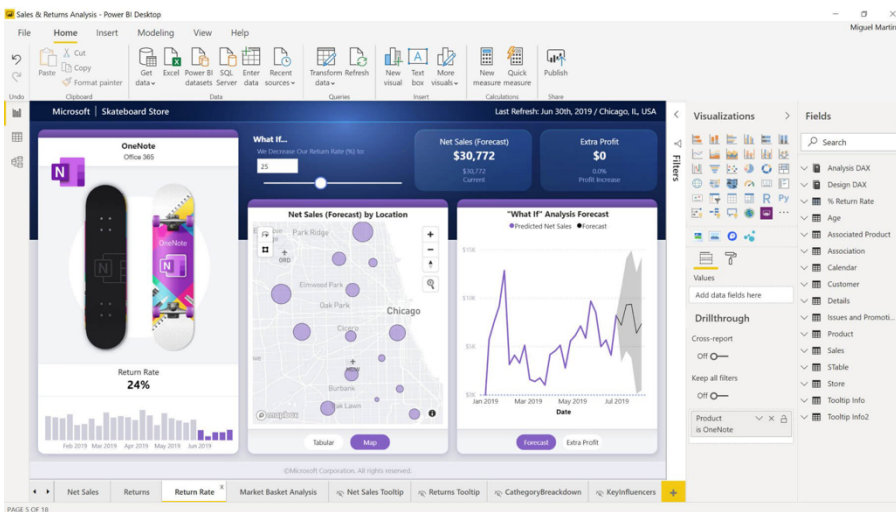
## 2 Micro-module E-E1: Information Graphics

Infographics have the power to present complex data in a concise, highly visual way. They tell data stories effectively by making information easy to digest, educational, and engaging. Infographics have been commonly used in presenting scientific research including quantitative urban analytic areas. In this tutorial, you will learn the basic skills of creating infographics, including the introduction on types and their application in urban research, different sources/platforms for easily making infographics.

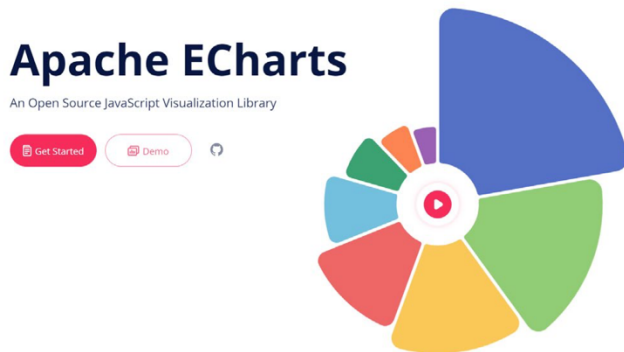
### Application of infographics in urban research



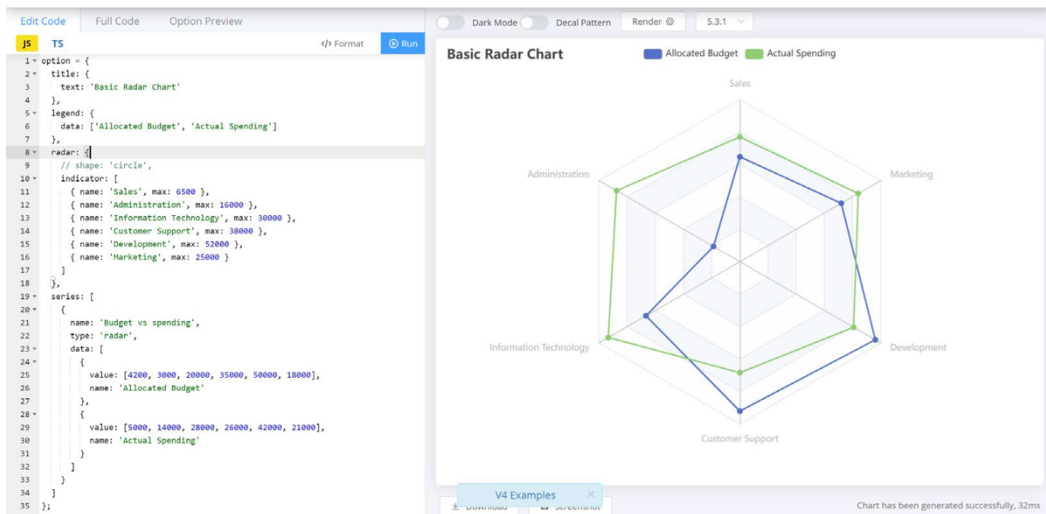
### Tools/ Platforms for Making Infographics



### Online tools



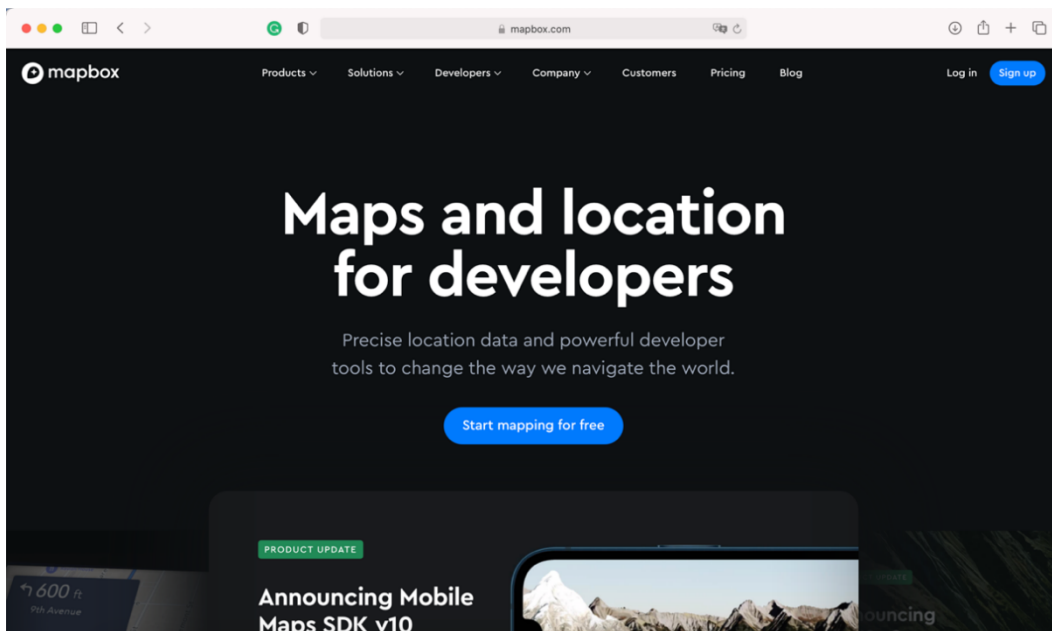
Also, this micro-module will show how to make a radar chart via Echarts as an example.



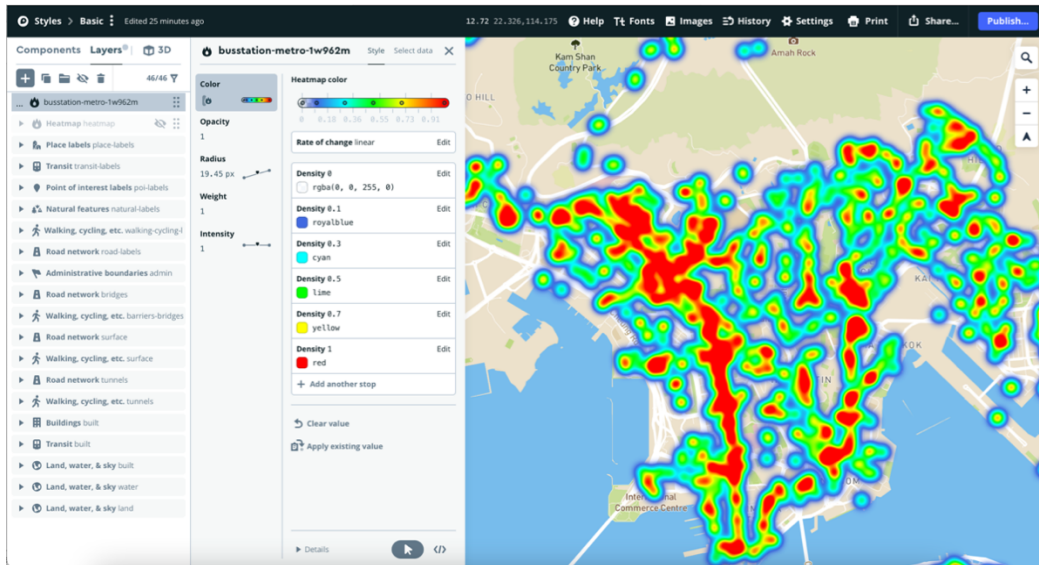
### 3 Micro-module E-E2: Spatial Data Mapping and Diagramming

This guide will introduce the method of visualizing spatial data through Mapbox, including the method of adding new data layers to generate a heat-map and using the intelligent component in Mapbox to generate 3D extrusion map.

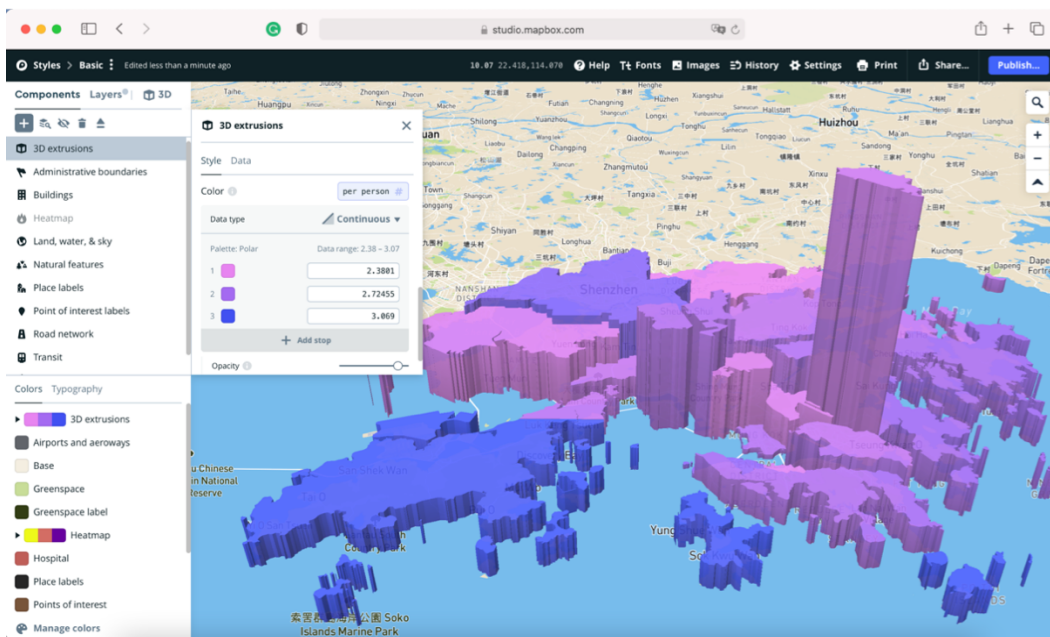
The first part is the preparation work before using Mapbox, including the basic introduction of Mapbox studio, as well as the method of registering account and uploading data, etc.



Second is the use of Mapbox basic function to visualize spatial data, in this guide we will use the dataset of the distribution of Hong Kong bus station to generate a heat-map as an example to introduce.



Finally, we will use the data visualization component of Mapbox to visualize spatial data. In this guide, we will use the total number of public rental housing units and the number of occupied units per capita in 18 districts in Hong Kong to generate a 3D extrusion map as an example to explain.

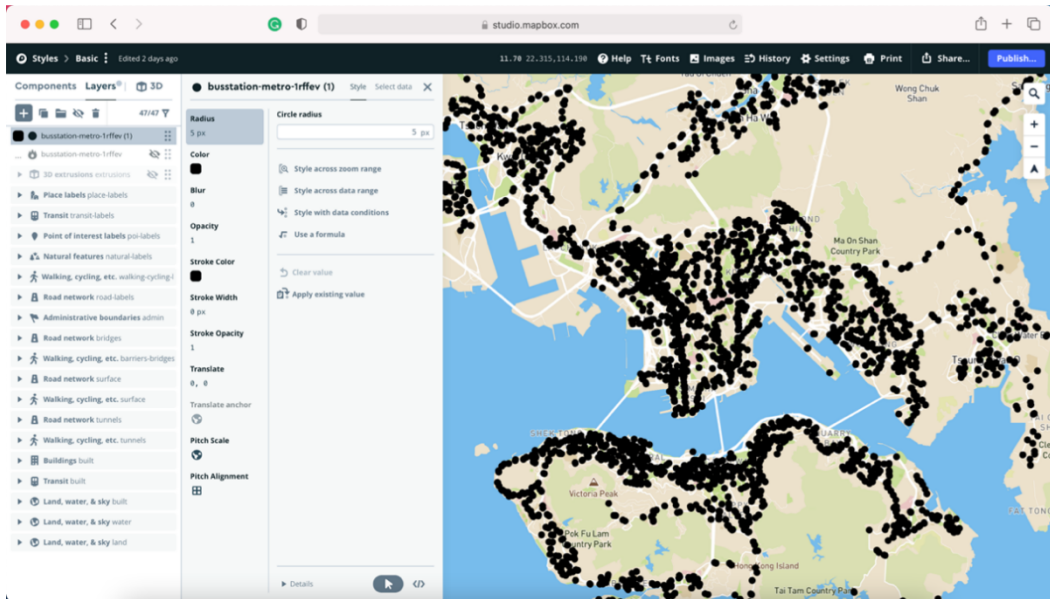


#### 4 Micro-module E-E3: Interactive Online Data-maps

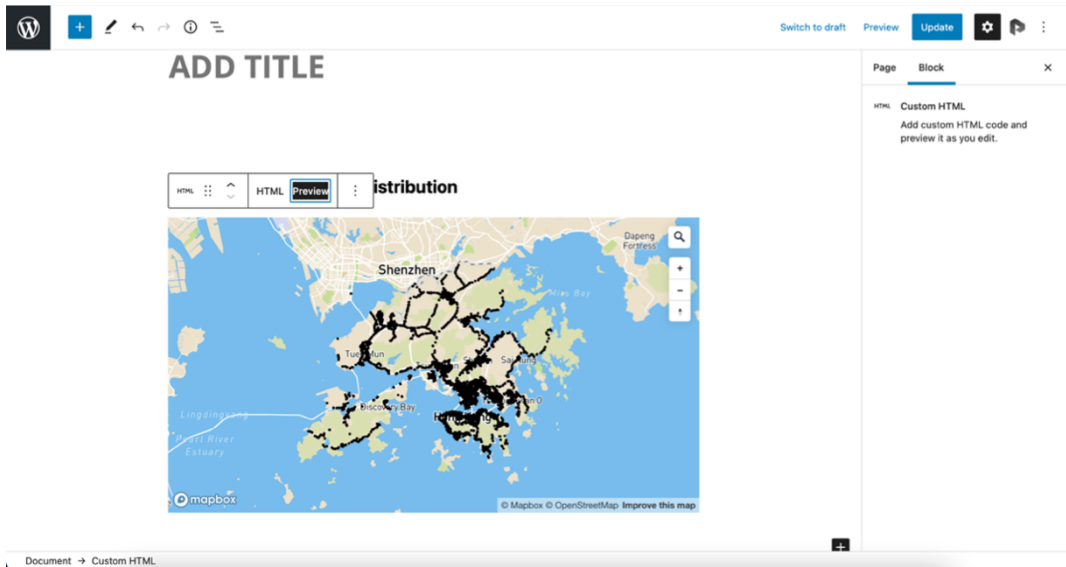
This guide will show you how to create an interactive map in Mapbox and add the interactive map to your site using Wordpress, and how to change the size of the interactive map block.

There are two main parts in this guide. The first part includes uploading map data through Mapbox and creating interactive map, changing map attributes of the interactive map, and exporting map.





The second part covers the steps to create a new website page in Wordpress, how to insert the map block into the new page, and how to change the attributes of the map block in Wordpress.



By the end of this guide, you will have learned how to add an interactive map to your website page. This will give you a more direct and efficient way to express map data on your website, which will increase the amount of information displayed.