
Sprint Review

Getting to Know Shapefiles and GeoJSON



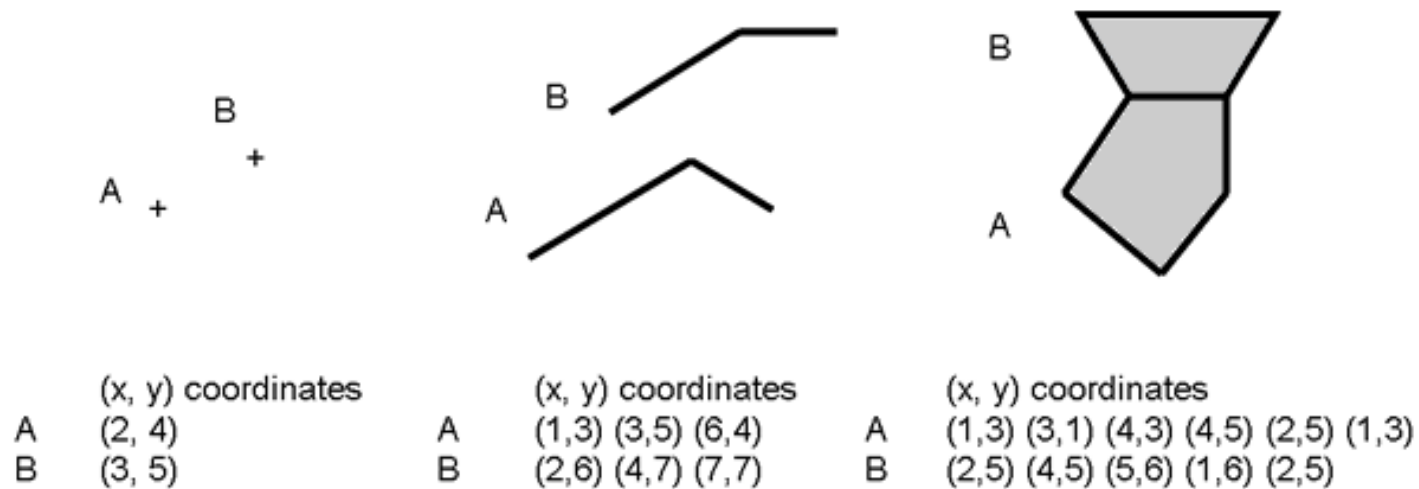
devleague

Getting to Know Shapefiles

- Geographic Information Systems (GIS) analyze and manipulate spatial data
- Vector and raster data are the most common data formats for GIS
- Shapefiles are the most common vector data format for GIS
- Both the shapefile format and [ArcGIS](#) were developed by [Esri](#)

Getting to Know Shapefiles

- Vector data uses points with lat/long coordinates, lines (pairs of points), and areas/polygons (groups of points) to represent discrete features and boundaries.
- **Shapefiles can support point, line, and area features.**

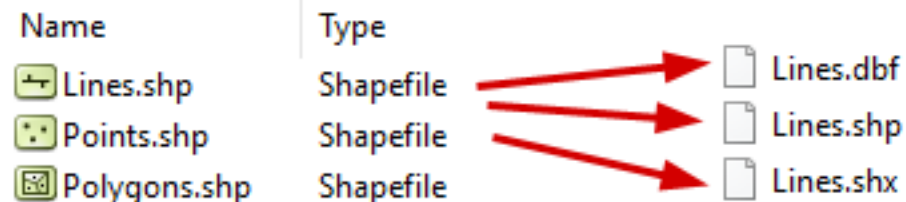


<http://www.restore.ac.uk/geo-refer/images/Concepts%20-%20geographical%20objects%20in%20GIS.png>

Getting to Know Shapefiles

- **An ESRI shapefile consists of multiple files stored in the same .shp directory**
 - **Shapefile** (.shp) a binary file with vector feature geometry, each record describes a shape with a list of its vertices.
 - **Shape index file** (.shx.) used to search forward and backward
 - **dBASE table** (.dbf.) a database file storing feature IDs & attribute

The main shapefile, the index file, and the dBASE file must all have the same prefix.



Getting to Know Shapefiles

I explored the shapefile of the Statewide Agricultural Land Use Baseline 2015 Study

- The zipped shapefile (2015AgBaseline.shp.zip) is 11.8 mb,
- Ufolder (2015AgBaseline.shp) is 19 mb.
- Within the unzipped file are the 3 mandatory files:
 - **2015AgBaseline.shp** the shapefile containing the geospatial features
 - **2015AgBaseline.shx**
 - **2015AgBaseline.dbf** the database file containing attributes that can be associated with the shapefile

Getting to Know Shapefiles

Within the unzipped file are also 8 other files:

- **2015AgBaseline.CPG** an optional plain text file describing the encoding used to create the shapefile
- **2015AgBaseline.lyr** is a visual representation of a layer
- **2015AgBaseline.prj** which is the layer projection data
- **2015AgBaseline.sbx** an optional spatial index file that helps speed things up
- **2015AgBaseline.sbn** optimize spatial queries in tandem with .sbx
- **2015AgBaseline.shp.xml** which is an xml version of the entire metadata
- **2015AgBaseline_Protocols.pdf** which explains the research protocols
- **aglanduse_2015.pdf** which is the metadata file explaining the shapefile

Getting to Know GeoJSON

- JSON is a "lightweight, text-based, language-independent data interchange format" ([JSON spec](#)). JSON structures data following a set formatting rules.
- GeoJSON is a "geospatial data interchange format based on JSON" and it defines several types of JSON objects and the manner in which they are combined to represent data about geographic features, their properties, and their spatial extents" ([GeoJSON Spec](#)).

Getting to Know GeoJSON

- GeoJSON uses the World Geodetic System 1984 (WGS 84) geographic coordinate reference system (CRS)
- Latitude and longitude are represented in decimal degrees
 - as opposed to degrees °, minutes, and seconds
- Lat and long are [ordered differently](#) in different file types
 - Both GeoJSON and Shapefiles use the order: long lat
- GeoJSON has 7 different "geometry types"
 - "Point", "MultiPoint", "LineString", "MultiLineString", "Polygon", "MultiPolygon", and "GeometryCollection".

Attempting to Convert a Shapefile to GeoJSON

Tried a few different online tools to convert .shp to .geojson

Attempting to Convert a Shapefile to GeoJSON

Mapshaper

- Mapshaper quickly uploaded my data
- Upon upload it showed the polygons of the entire dataset and could be zoomed into and around
- There are a few export options
- I exported as GeoJSON file, 2015AgBaseline.json and 41.3 mb in size

MyGeodata Converter

MyGeodata Converter uploaded my data fairly quickly.

Handily it has a viewer with a bounding box of the spatial extent the file overlaid a basemap

Unhandily it has a paywall and would only export a sample of the file

The file downloaded as mygeodata.zio and unzipped to 2015AgBaseline.geojson, but due to the trimming was only 214 kb

ogr2ogr web client

Upon reset, check the 'force download' button, on the entire JSON export will load in

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Attempting to Convert a Shapefile to GeoJSON

[ogr2ogr web client](#)

- User must check the 'force download' button or the entire JSON output will load in the browser window.
- File downloaded as convert.json and 38.5 mb in size

In Summary

- Shapefiles are a package of files, the primary of which (.shp, .shx) are stored in binary
- JSON files on the other hand are human-readable (ASCII)

Pau