

GEOJSON

1

ISE369/POL369

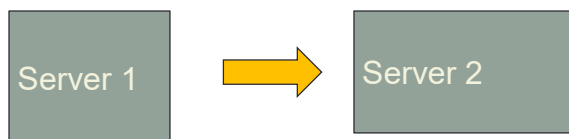
© Robert Kelly 2023-2026

2

How Do We Transmit Objects Between Servers?

- Data transmission approaches
 - Primitives (e.g., name/value pairs)
 - Specific structured data (e.g., JPEG image) as a MIME data type
- But many objects involve structured data that is not logically represented as a stream
- Approaches
 - EDI/Embedded file formats
 - XML
 - JSON

Is there a file format better
than a Shapefile?



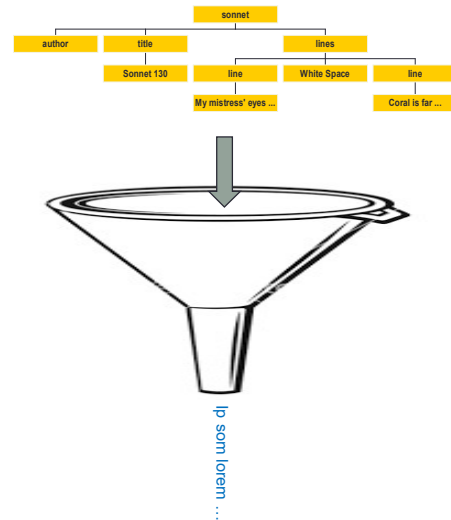
2

Terminology

- **Serialization**

- Process of translating data structures or object state into a format that can be stored and reconstructed later in the same or another computer environment (also called marshalling)
- A simple way to persist live objects to persistent storage

- **Unmarshalling** – reverse process



3

What is JSON?

- JavaScript Object Notation
- Data serialization format
- Open standard format for the interchange of name/value pair objects
- Alternative to XML
- Language independent format, although originally derived from JavaScript

4

ISE369/POL369

© Robert Kelly 2023-2026

5

JSON Syntax

- Data is in name/value pairs (aka key/value) with a : separating the key and the value
- Keys must be enclosed in double quotes
- Key/value pairs separated by commas
- Curly braces define objects
- Square brackets define arrays

```
"properties": {
  "OBJECTID": 1,
  "District": 1,
  "Name": "Nick LaLota",
  "Party": "Republican",
  "Phone": "202-225-3826",
  "Email": "https://lalota.house.gov/contact",
  "Dist_Phone": "631-289-1097",
  "Address": "122 Cannon House Office Building",
  "Address2": null,
  "City": "Washington",
  "ZIP": "20515",
  "State": "DC"
}
```

JSON syntax is a subset of JavaScript object syntax

5

ISE369/POL369

© Robert Kelly 2023-2026

6

GeoJSON

- Open standard format for representation of simple geographical features (plus non-geographic features)
- Features – points, line strings, polygons, and multi-part counterparts



```
{
  "type": "Polygon",
  "coordinates": [
    [[30.0, 10.0], [40.0, 40.0], [20.0, 40.0], [10.0, 20.0], [30.0, 10.0]]
  ]
}
```

Image: Wikipedia

6

ISE369/POL369

© Robert Kelly 2023-2026

7

Example ...

- We download the 2024 Congressional District boundary file in GeoJSON format from <https://data.gis.ny.gov/datasets/nys-congressional-districts/about>
- To view it, you will need a viewer for JSON
- Options
 - Notepad++
 - in menu bar, select Plugins > Plugins Admin
 - Search for JSON Viewer, check box and install
 - If needed, change your file type to json
 - Go to plugins > JSON Viewer > Format JSON to display

7

ISE369/POL369

© Robert Kelly 2023-2026

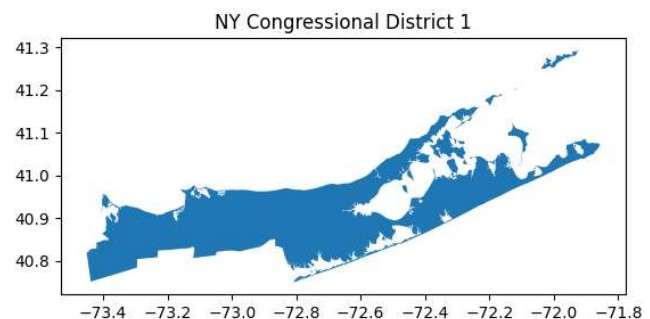
8

... Example

- The file contains boundary data for all congressional districts in NY
- In Notepad++ we delete all but the data for Congressional District 1

```
os.chdir('G:/My Drive/Courses/ISE369/Data'
          + '/GeoDataDisplayLesson')
ny_cd1 = gpd.read_file('NYS_Congressional_District_01.json')
ny_cd1.plot()
plt.title('NY Congressional District 1')
plt.show()
```

Note: this district map
is a multipolygon



8

ISE369/POL369

© Robert Kelly 2023-2026

9

Are We on Track?

- Search online for any GeoJSON, maybe one for your favorite state
- Download the file
- Display the geographic figure

9

ISE369/POL369

© Robert Kelly 2023-2026

10

JSON for NY-1

```
{
  "type": "FeatureCollection",
  "crs": {
    "type": "name",
    "properties": {
      "name": "EPSG:4326"
    }
  },
  "features": [
    {
      "type": "Feature",
      "id": 1,
      "geometry": {
        "type": "MultiPolygon",
        "coordinates": [
          [
            [
              -72.8053589608014,
              40.7555881655836
            ]
          ]
        ]
      }
    }
  ]
}
```

What is crs?

Now that we can read a boundary file, we'd like to find out more about some of the contents

What is EPSG:4326?

What are these number pairs?

10