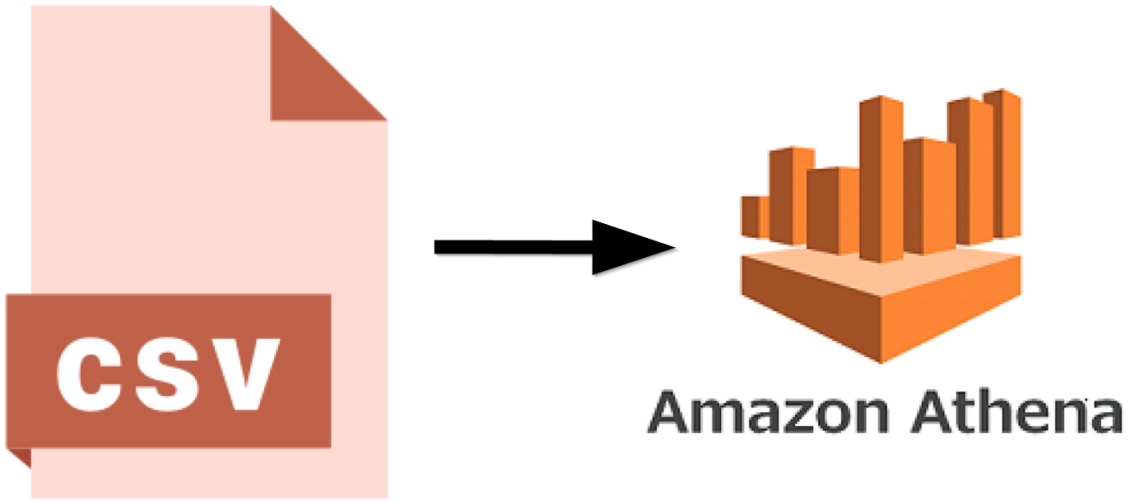
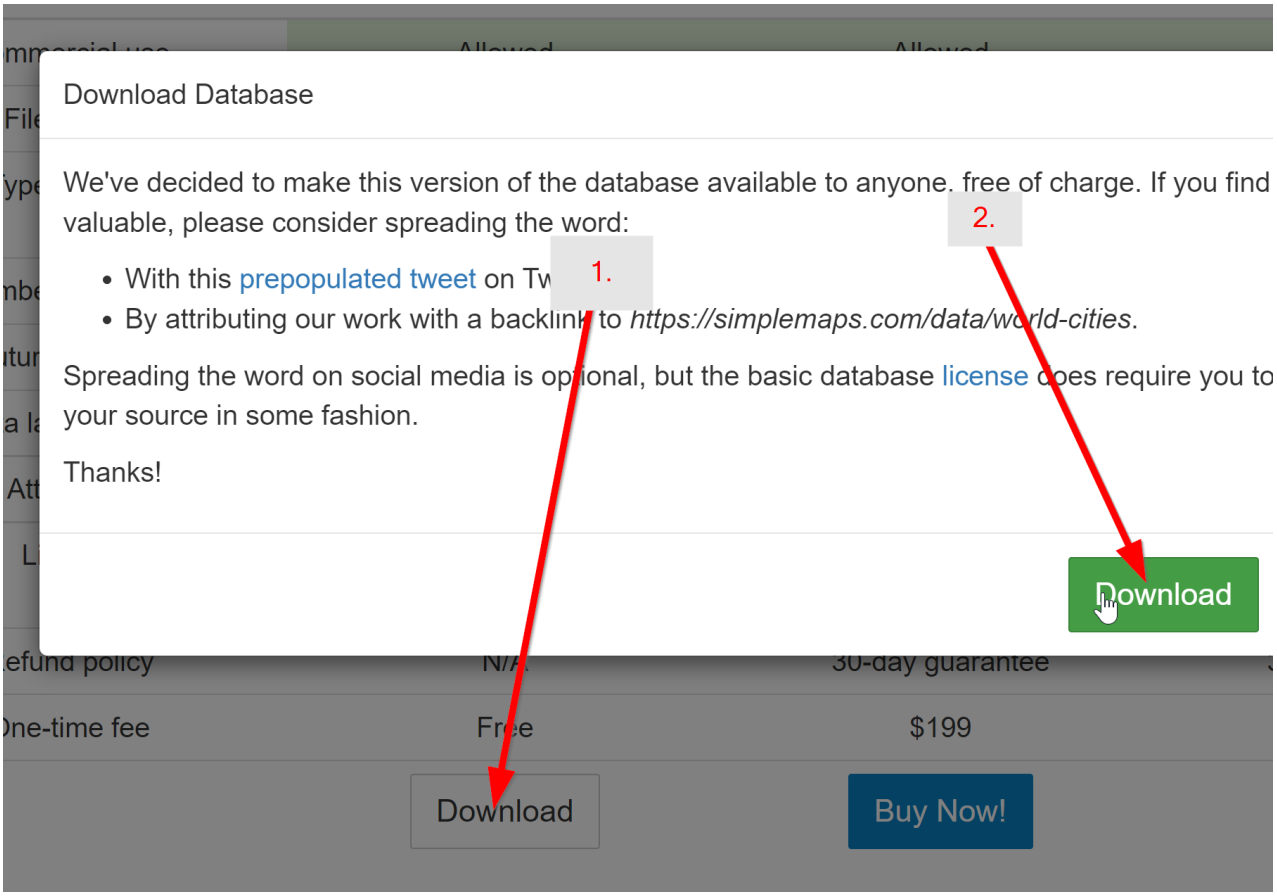
simplemaps
Interactive Maps & Data

Load a CSV file into AWS Athena for SQL Analysis

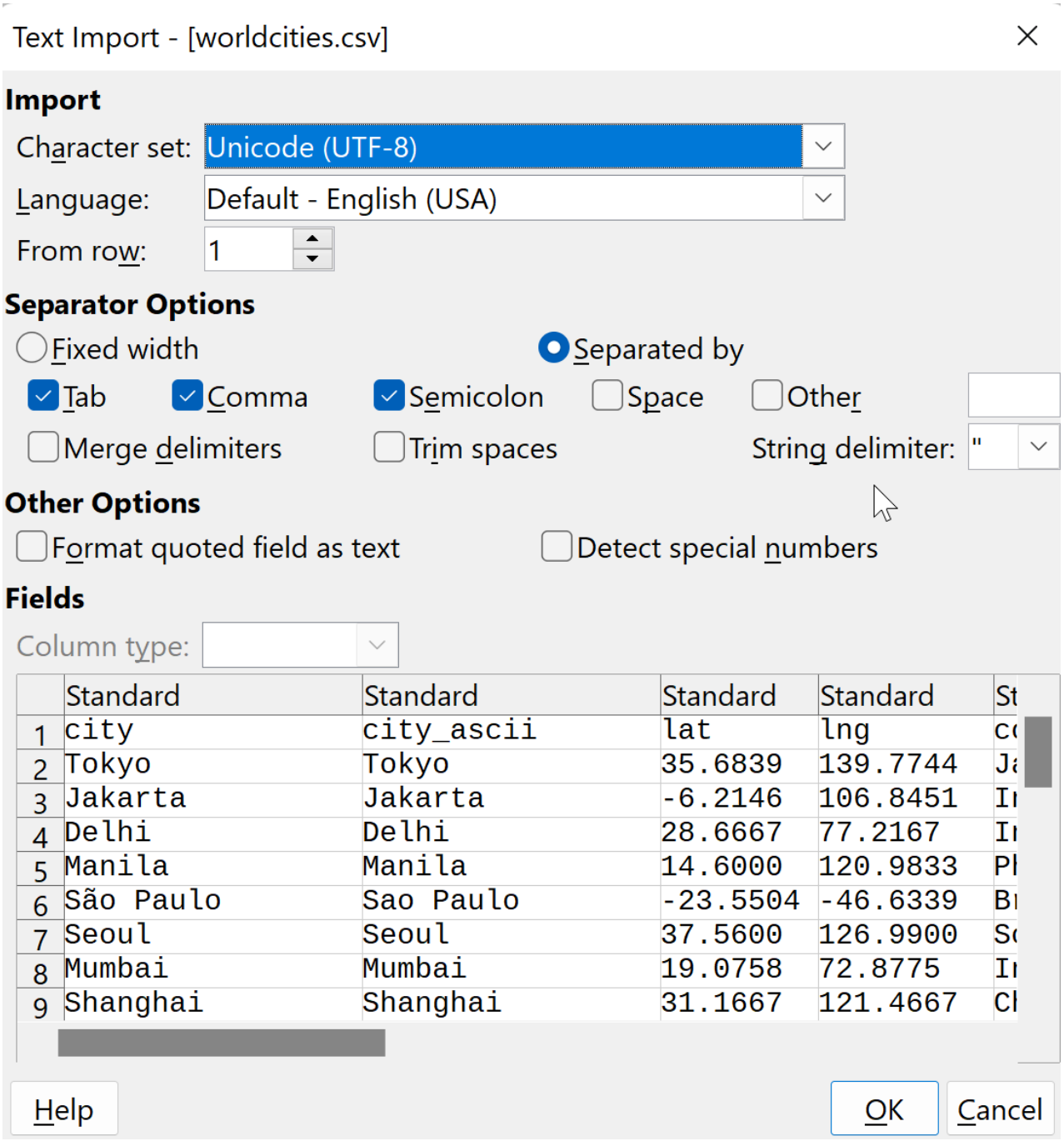


This tutorial will teach you how to load a CSV file into AWS Athena so that you can analyze it using SQL queries. This process will work for any CSV file, but in this tutorial we'll be using the free version of our World Cities Database (https://simplemaps.com/data/world-cities). You could also use it with any of our many geographic databases (https://simplemaps.com/data). Let's get started

1. Login or create an AWS Account (https://aws.amazon.com).
2. Download the Basic World Cities Database (https://simplemaps.com/data/world-cities).
   This is free and won't require you to provide any information. However, attribution is required. After downloading, unzip the folder. We'll be using the `worldcities.csv` file.



3. Clean and format the CSV as needed. The CSV file should be encoded as UTF-8. Due to the way Athena parses CSV files, we also need to remove all quotes from the CSV file. The easiest way to do this is to open the CSV file in LibreOffice (https://www.libreoffice.org/download/download-libreoffice/):

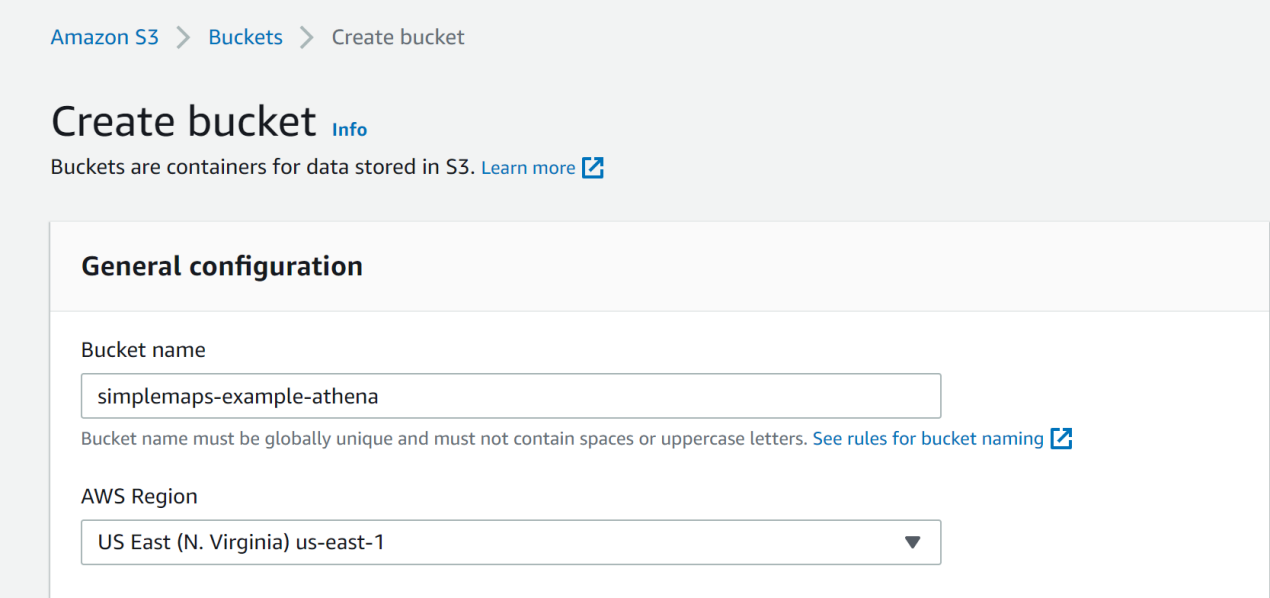


and then save it. Note the absence of quotation marks.

```
city,city_ascii,lat,lng,country,iso2,iso3,admin_name,capital,population,id
Tokyo,Tokyo,35.6839,139.7744,Japan,JP,JPN,Tōkyō,primary,39105000,1392685764
Jakarta,Jakarta,-6.2146,106.8451,Indonesia,ID,IDN,Jakarta,primary,35362000,1360771077
Delhi,Delhi,28.6667,77.2167,India,IN,IND,Delhi,admin,31870000,1356872604
Manila,Manila,14.6,120.9833,Philippines,PH,PHL,Manila,primary,23971000,1608618140
São Paulo,Sao Paulo,-23.5504,-46.6339,Brazil,BR,BRA,São Paulo,admin,22495000,1076532519
Seoul,Seoul,37.56,126.99,South Korea,KR,KOR,Seoul,primary,22394000,1410836482
Mumbai,Mumbai,19.0758,72.8775,India,IN,IND,Mahārāshtra,admin,22186000,1356226629
Shanghai,Shanghai,31.1667,121.4667,China,CN,CHN,Shanghai,admin,22118000,1156073548
Mexico City,Mexico City,19.4333,-99.1333,Mexico,MX,MEX,Ciudad de México,primary,21505000,1484247881
Guangzhou,Guangzhou,23.1288,113.259,China,CN,CHN,Guangdong,admin,21489000,1156237133
Cairo,Cairo,30.0444,31.2358,Egypt,EG,EGY,Al Qāhirah,primary,19787000,1818253931
Beijing,Beijing,39.904,116.4075,China,CN,CHN,Beijing,primary,19437000,1156228865
New York,New York,40.6943,-73.9249,United States,US,USA,New York,,18713220,1840034016
```

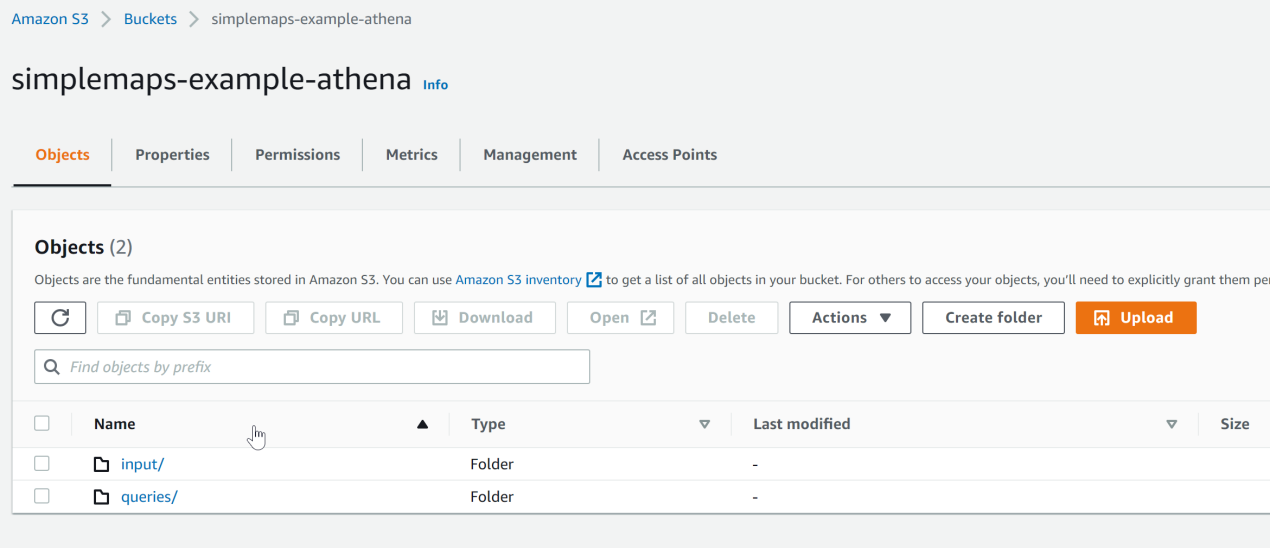
If you just want the CSV file after this has been done, you can download it here (/static/img/resources/csv-to-athena/worldcities.csv). Note: Do not try to do this with Excel because it does not handle UTF-8 characters well.

4. Create a new AWS S3 Bucket. We'll use the name `simplemaps-example-athena`. You will need to use a unique name of your own.

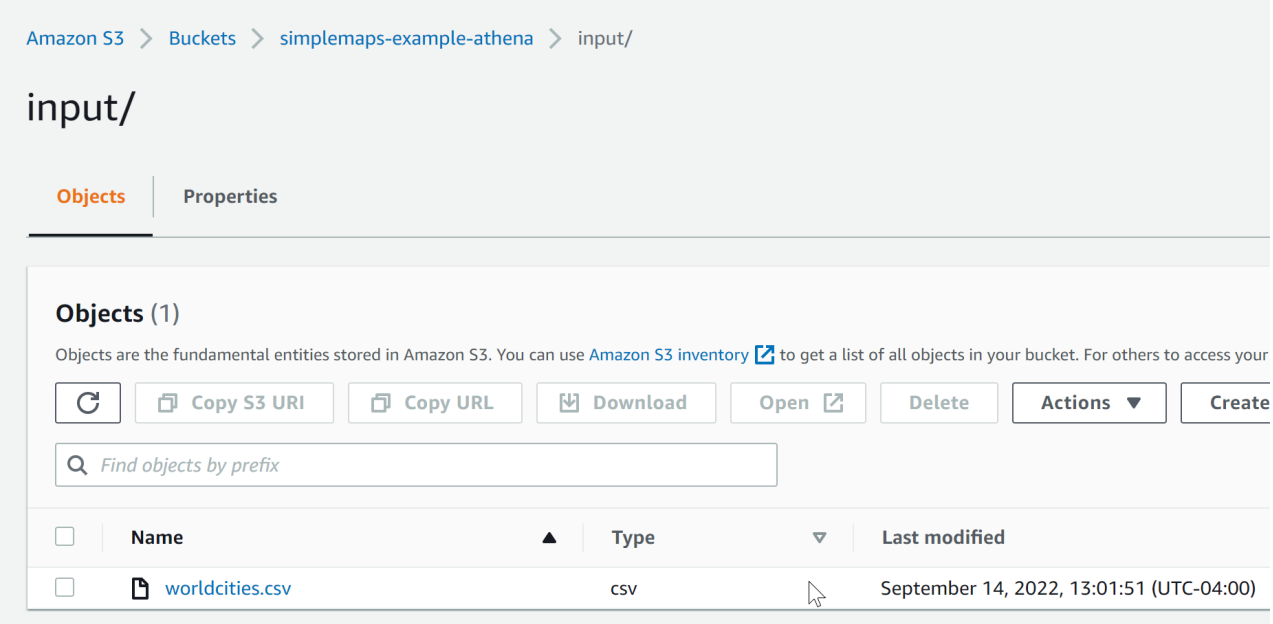


Use all of the default settings.

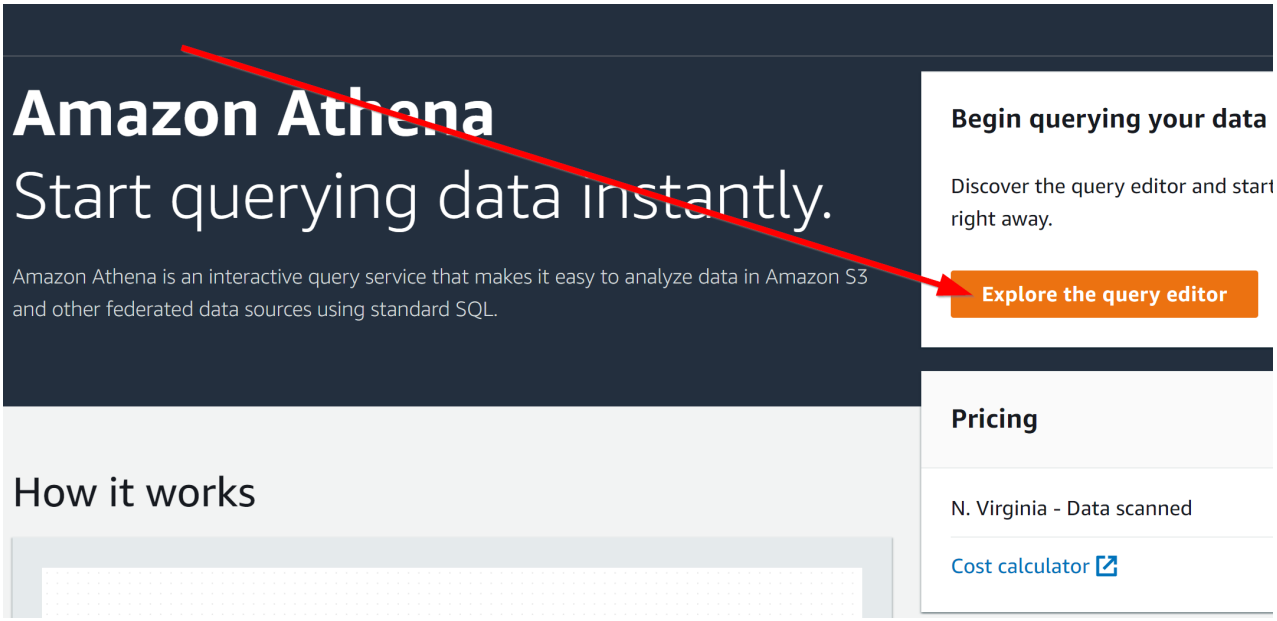
5. Create two folders in the bucket: `input` and `queries`. Athena will use the `queries` folder to store the queries it runs.
6. Upload the `worldcities.csv` file to the `input` folder you just created.
7. If you did things correctly, your bucket should look like this:



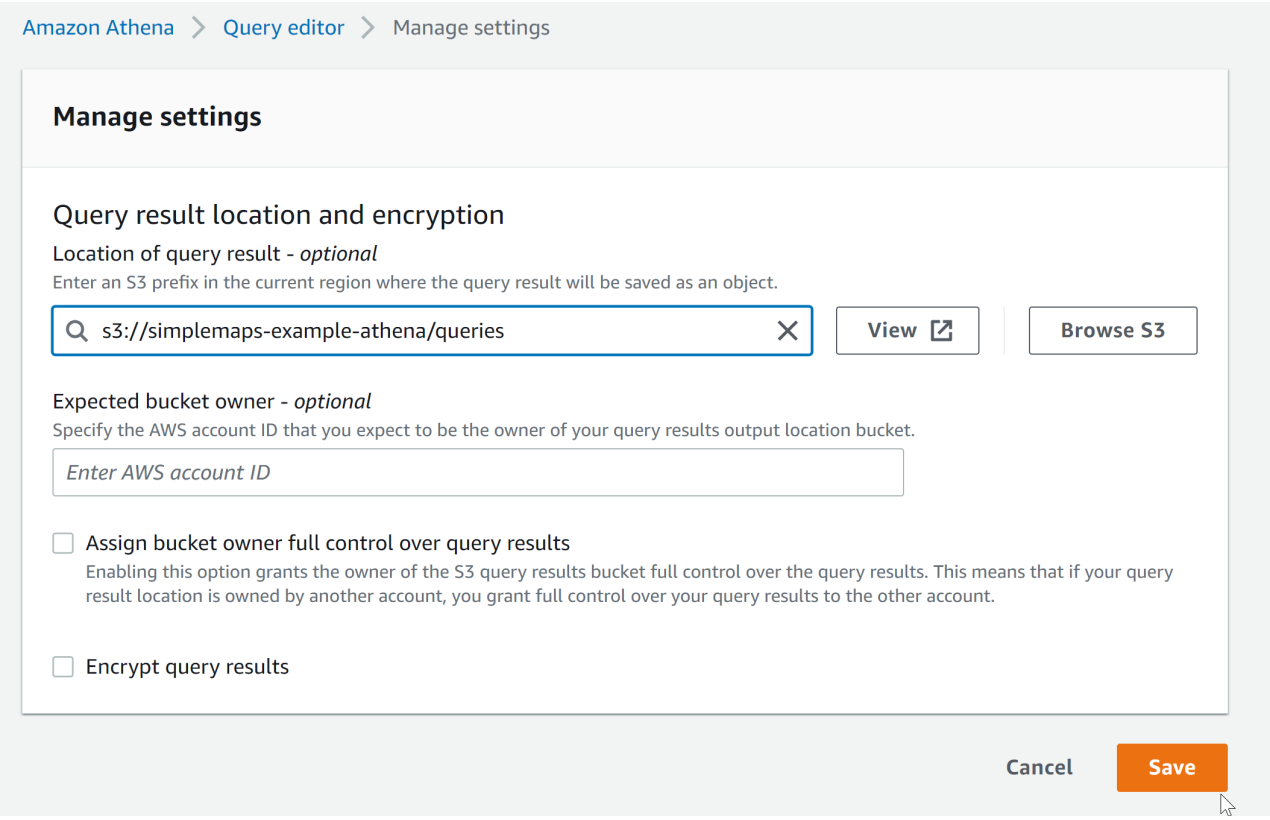
and the input folder should look like this:



8. Open Amazon Athena and click **Explore the Query Editor**.



9. Go to the Settings tab and set the location of the query result to be `s3://simplemaps-example-athena/queries`. Except, of course, use your own unique bucket name.

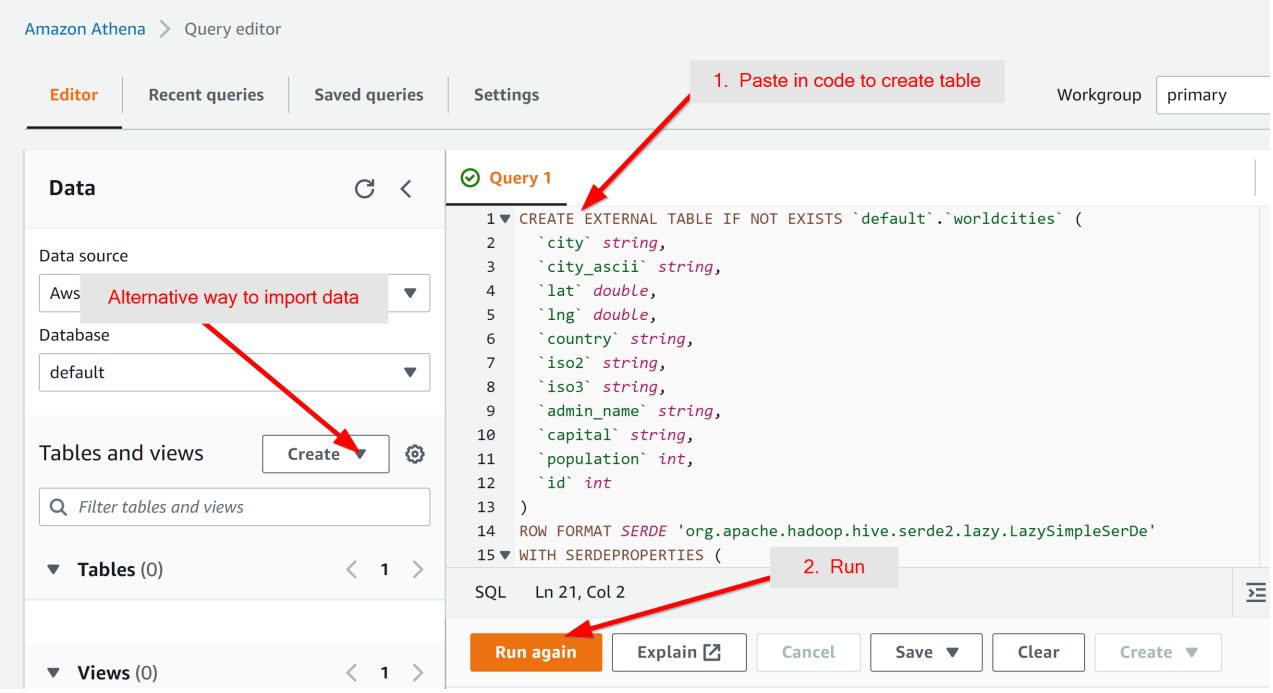


This is where Athena will store the queries that it runs.

10. It's possible to import the data using the "Create" button, but we will import the data using a Query. Paste the following into the query area:

```
CREATE EXTERNAL TABLE IF NOT EXISTS `default`.`worldcities` (
  `city` string,
  `city_ascii` string,
  `lat` double,
  `lng` double,
  `country` string,
  `iso2` string,
  `iso3` string,
  `admin_name` string,
  `capital` string,
  `population` int,
  `id` int
)
ROW FORMAT SERDE 'org.apache.hadoop.hive.serde2.lazy.LazySimpleSerDe'
WITH SERDEPROPERTIES (
 'serialization.format' = ',',
 'field.delim' = ','
)
LOCATION 's3://simplemaps-example-athena/input/'
TBLPROPERTIES ('skip.header.line.count'='1')
```

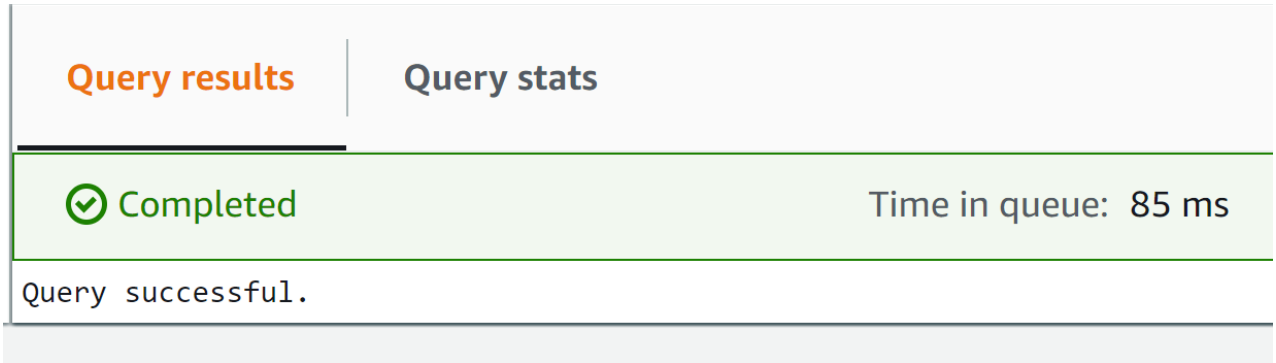
then click Run:



A few things to note on what this does:

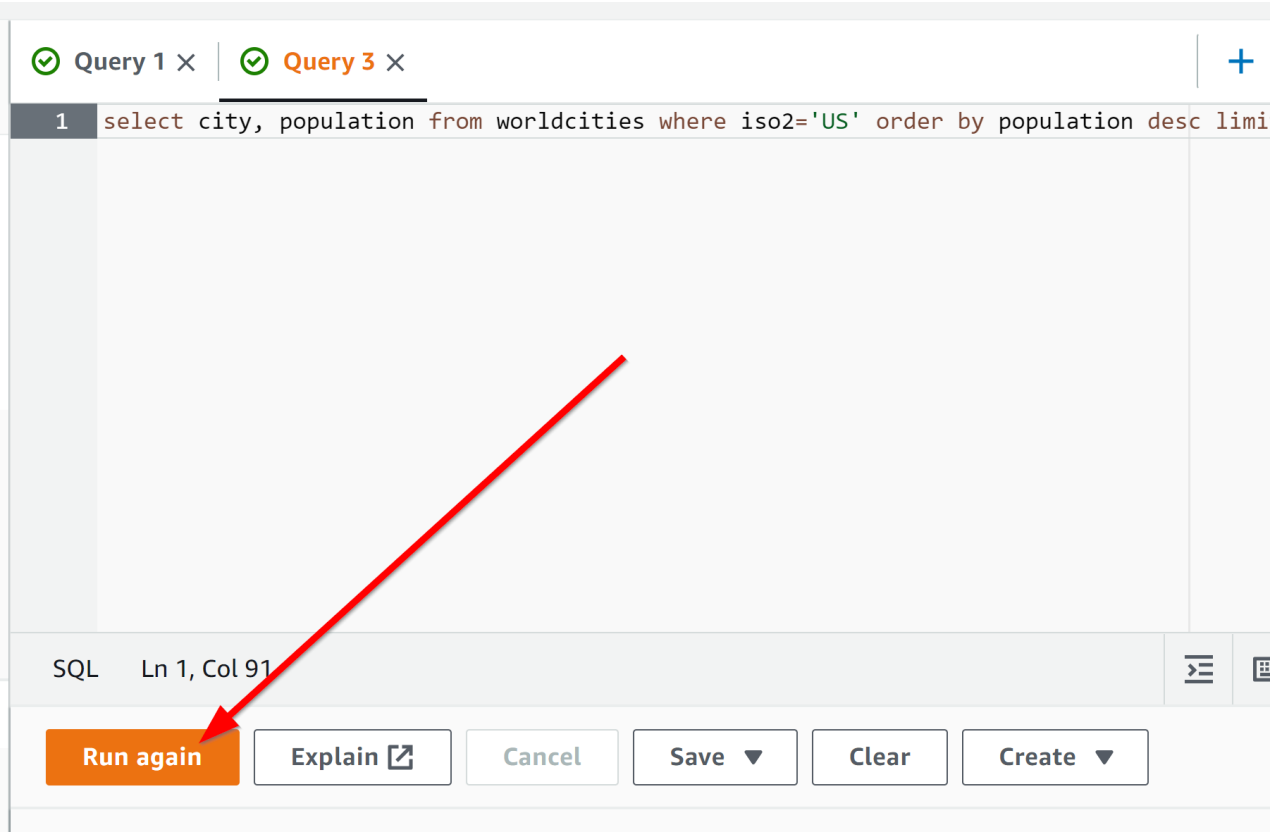
- We have defined all of the fields in the dataset and given them an appropriate type.
- We've told Athena to use the LazySimpleSerDe (https://docs.aws.amazon.com/athena/latest/ug/lazy-simple-serde.html) CSV parser. We use this parser because it allows Null values for numbers. It does not support quoted values, though, which is why we removed those earlier with LibreOffice. You can learn more about parsers in this helpful guide (https://athena.guide/articles/working-with-csv/).
- We've told the parser that fields are delimited by commas and that the first row contains fieldnames which can be skipped.
- We've specified the location of the CSV file. We only need to provide the folder, not the file itself.

11. If the import was successful, you'll see a green "Completed" message:

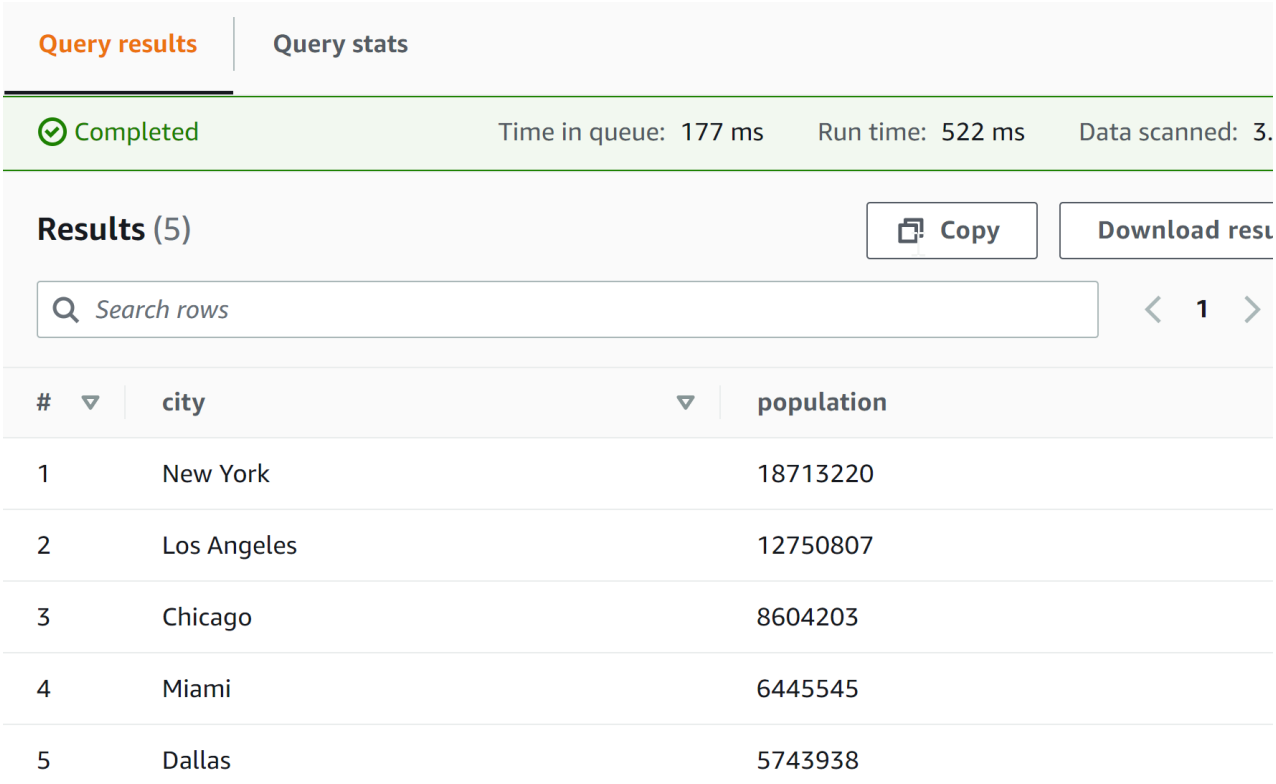


12. Test the data with the following query:

```
select city, population from worldcities where iso2='US' order by population desc limit
```



and you should get the five largest cities in the United States:



#	city	population
1	New York	18713220
2	Los Angeles	12750807
3	Chicago	8604203
4	Miami	6445545
5	Dallas	5743938

13. Now you can query your CSV file using any other SQL queries you like!
14. To learn how to run these queries over a url, see our next tutorial Query an Athena database over a URL with AWS Lambda (/resources/athena-over-url).

Resources

Tools, freebies, and articles about mapping and web development. Things we've learned and want to share!

- Introduction (./)

Free SVG Maps

- All Free SVG Maps (svg-maps)
- World SVG Map (svg-world)
- USA SVG Map (svg-us)

Free Interactive Maps

- Free World Map (free-world-map)
- Free US Map (free-us-map)
- Free Continent (free-continent-map)

Data Articles

- CSV to Athena (/resources/csv-to-athena)
- Athena over URL (/resources/athena-over-url)
- Import CSV into MySQL (/resources/import-csv-mysql)
- Import data subset with Power Query (/resources/power-query)
- Retreive demographic data with VLOOKUP (/resources/vlookup)
- Import CSV into Tableau (/resources/import-tableau)
- Visualize places in QGIS (/resources/cities-qgis)
- Filter places in Excel (/resources/filter-excel)
- Location distance code (.js and .py) (/resources/location-distance)

Map Articles

- Guide to MapShaper (/resources/guide-to-mapshaper)
- Overlay polygons on Google Maps (/resources/shapes-google-maps)
- Using Google Cloud (/resources/google-cloud-project)
- Introduction to customizing SVG (/resources/customize-us-svg)
- Software we use at SimpleMaps (/resources/software-at-simplemaps)
- Alternative to Google Maps (/resources/alternative-to-google-maps)
- Flash vs. HTML5 maps (/resources/flash-vs-html5)

Data and Tools

- US Address/Cities Geocoder (us-geocoder)
- World cities data (by country) (/resources/free-country-cities)

Visualizations

- US Gold Medalists Rio 2016 (/viz/rio16)
- US Unemployment (auto-updated) (/viz/unemployment)
- Snakes and Bears (/viz/wild)
- Zip Code Visualizations (/resources/zip-code-visualizations)

Links

- Raphael.js (http://dmitrybaranovskiy.github.io/raphael/)
- MapShaper (http://www.mapshaper.org/)
- Old articles about Flash maps (/flash)

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