

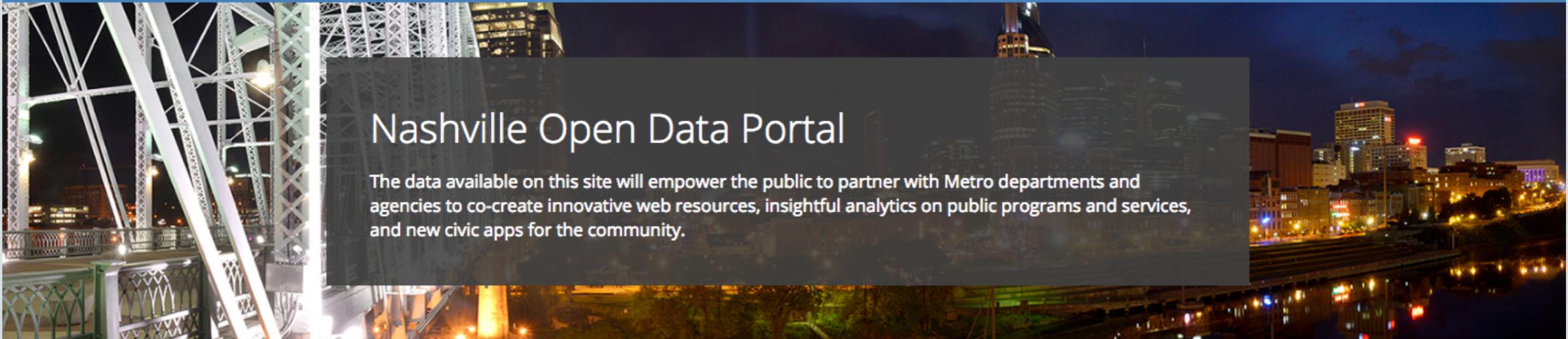
# **Creating a Map of Nashville Public Art**

- 1. Location**
- 2. DataFrames and GeoDataFrames**
- 3. Geometry**
- 4. Spatial Joins**
- 5. Plotting points within polygons**
- 6. Adding context with a street map**



# Public art in Nashville





## Nashville Open Data Portal

The data available on this site will empower the public to partner with Metro departments and agencies to co-create innovative web resources, insightful analytics on public programs and services, and new civic apps for the community.



Business, Development & Housing



Culture



Education

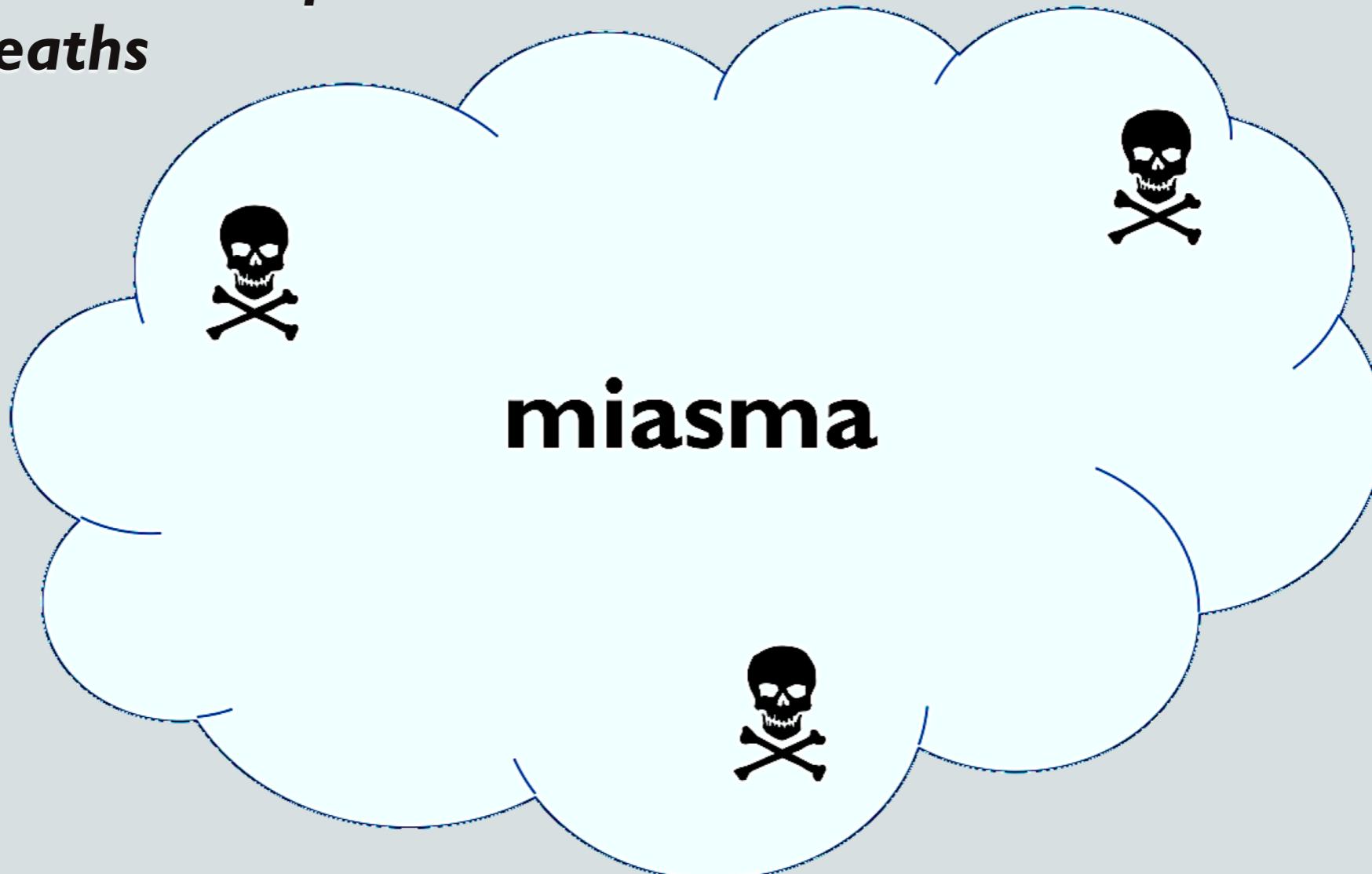


Environment

# **Location**

*first, a bit of history....*

- **London cholera epidemic - 1854**
- **600+ deaths**



***John Snow***





# **DataFrames and GeoDataFrames**

**“A DataFrame is a 2-dimensional labeled data structure with columns of potentially different types. You can think of it like a spreadsheet or a SQL table or a dict of Series objects.”**

*<https://pandas.pydata.org/pandas-docs/stable/dsintro.html>*

# **Geometry**



**Point**



**Line**



**Polygon**

# ***Coordinate Reference Systems***

WHAT YOUR FAVORITE

# MAP PROJECTION SAYS ABOUT YOU

MERCATOR



YOU'RE NOT REALLY INTO MAPS.

VAN DER GRIJNEN



YOU'RE NOT A COMPLICATED PERSON. YOU LOVE THE MERCATOR PROJECTION; YOU JUST WISH IT WEREN'T SQUARE. THE EARTH'S NOT A SQUARE, IT'S A CIRCLE. YOU LIKE CIRCLES. TODAY IS GONNA BE A GOOD DAY!

ROBINSON



YOU HAVE A COMFORTABLE PAIR OF RUNNING SHOES THAT YOU WEAR EVERYWHERE. YOU LIKE COFFEE AND ENJOY THE BEATLES. YOU THINK THE ROBINSON IS THE BEST-LOOKING PROJECTION, HANDS DOWN.

WINKEL-TRIPPEL



NATIONAL GEOGRAPHIC ADOPTED THE WINKEL-TRIPPEL IN 1998, BUT YOU'VE BEEN A WT FAN SINCE LONG BEFORE "NAT GED" SHOWED UP. YOU'RE WORRIED IT'S GETTING PLAMED OUT, AND ARE THINKING OF SWITCHING TO THE KAVRASIAN. YOU ONCE LEFT A PARTY IN DISGUST WHEN A GUEST SHOWED UP WEARING SHOES WITH TOES. YOUR FAVORITE MUSICAL GENRE IS "POST-".

Dymaxion



YOU LIKE ISAAC ASIMOV, XML, AND SHOES WITH TOES. YOU THINK THE SEGWAY GOT A BAD RAP. YOU OWN 3D GOGGLES, WHICH YOU USE TO VIEW ROTATING MODELS OF BETTER 3D GOGGLES. YOU TYPE IN DVORAK.

GOODE HOMOLOSINE



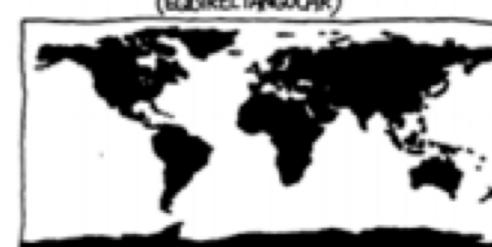
THEY SAY MAPPING THE EARTH ON A 2D SURFACE IS LIKE FLATTENING AN ORANGE PEEL, WHICH SEEMS EASY ENOUGH TO YOU. YOU LIKE EASY SOLUTIONS. YOU THINK WE WOULDN'T HAVE SO MANY PROBLEMS IF WE JUST ELECT NORMAL PEOPLE TO CONGRESS INSTEAD OF POLITICIANS. YOU THINK AIRLINES SHOULD JUST BUY FOOD FROM THE RESTAURANTS NEAR THE GATES AND SERVE THAT ON BOARD. YOU CHANGE YOUR CAR'S OIL, BUT SECRETLY WONDER IF YOU REALLY NEED TO.

HOB-DYER



YOU WANT TO AVOID CULTURAL IMPERIALISM, BUT YOU'VE HEARD BAD THINGS ABOUT GALL-PETERS. YOU'RE CONFLICT-AVERSE AND BUY ORGANIC. YOU USE A RECENTLY-INVENTED SET OF GENDER-NEUTRAL PRONOUNS AND THINK THAT WHAT THE WORLD NEEDS IS A REVOLUTION IN CONSCIOUSNESS.

PLATE CARRÉE  
(EQUAL-RECTANGULAR)



YOU THINK THIS ONE IS FINE. YOU LIKE HOW X AND Y MAP TO LATITUDE AND LONGITUDE. THE OTHER PROJECTIONS OVERCOMPLICATE THINGS. YOU WANT ME TO STOP ASKING ABOUT MAPS SO YOU CAN ENJOY DINNER.

WATERMAN BUTTERFLY



A GLOBE!



YES, YOU'RE VERY CLEVER.

PEIRCE QUINCUNCIAL



YOU THINK THAT WHEN WE LOOK AT A MAP, WHAT WE REALLY SEE IS OURSELVES. AFTER YOU FIRST SAW INCEPTION, YOU SAT SILENT IN THE THEATER FOR SIX HOURS. IT FREAKS YOU OUT TO REALIZE THAT EVERYONE AROUND YOU HAS A SKELETON INSIDE THEM. YOU HAVE REALLY LOOKED AT YOUR HANDS.

GALL-PETERS

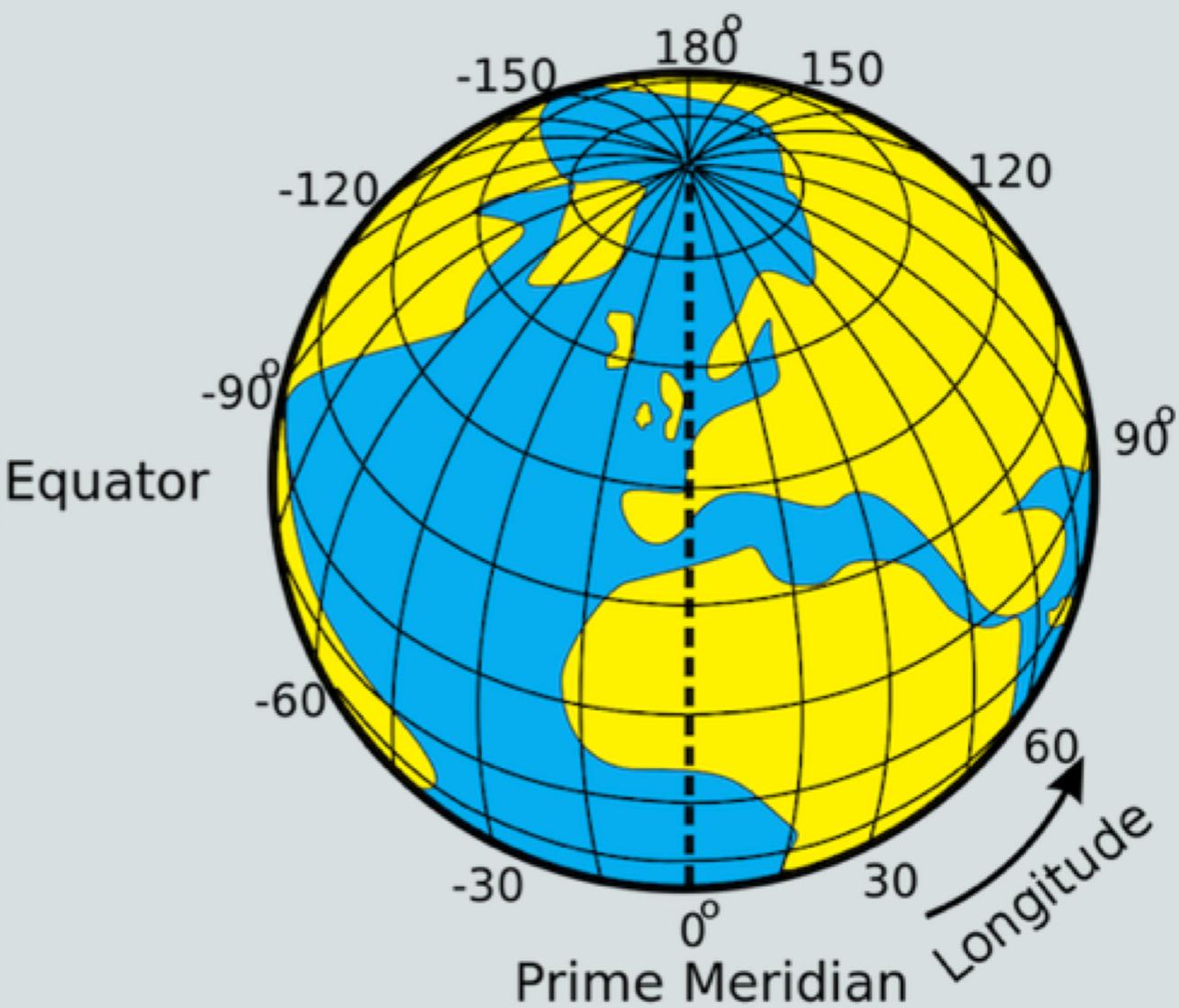
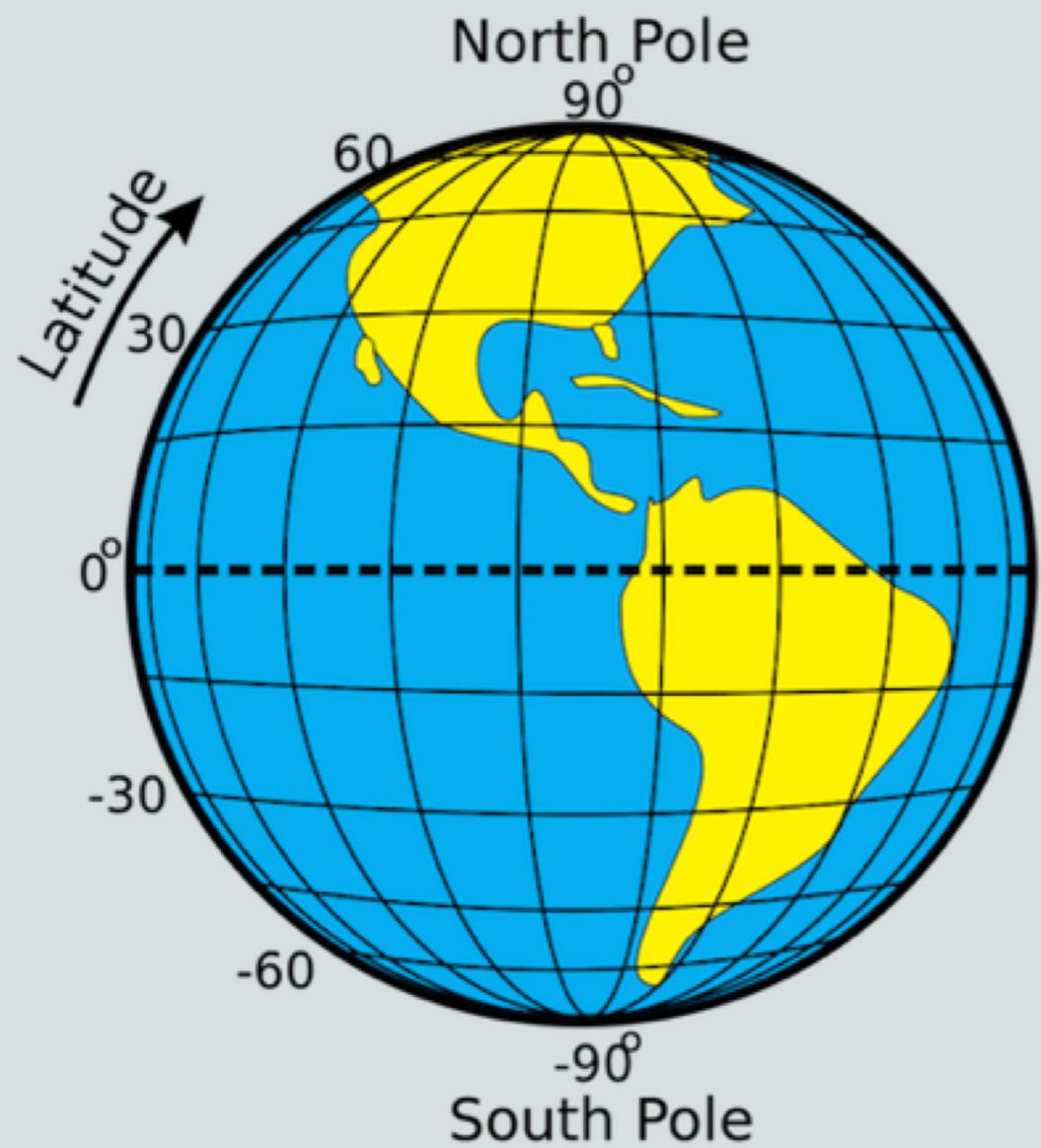


I HATE YOU.

What's that? You think I don't like the Peters map because I'm uncomfortable with having my cultural assumptions challenged? Are you sure you're not...

::puts on sunglasses:: ... projecting?

<http://xkcd.com/977/> - <http://bit.ly/explainxkcd-977>



## **Projection**

- **Web Mercator/WGS 84**

**Coordinate Reference System (use the WGS 84 projection)**

- **Google Maps - EPSG:3857**
- **Google Earth - EPSG:4326**

```
gpd.sjoin(geodfA, geodfB, op = 'within')
```

***op* (stands for operation)**

- ***within***
- ***intersects***
- ***contains***

***by* (which type of join)**

- ***inner* (the default)**
- ***left***
- ***right***

# **Plotting points within polygons**

- plot the polygons
- add a plot of points

# **Adding context with a street map**

# Folium

- python package built on the leaflet javascript library
- create interactive maps
- markers
- easy to customize popups