

# Location Intelligence in urban planning: Making better decision with human mobility data

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# CARTO

Pioneers in Location Intelligence

1,200

Customers

Accel

EARLYBIRD

150+

Team members

salesforce

FORRESTER®

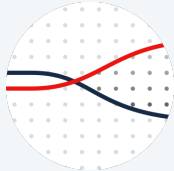
Gartner

Cool  
Vendor  
2017

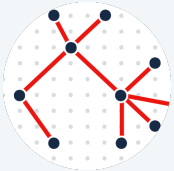
# CARTO turns location data into business outcomes in 5 key steps



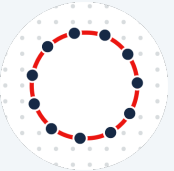
Data Ingestion & Management



Data Enrichment



Analysis













Solutions & Visualization



Integration

# Market-leaders in Cities & Governments use CARTO:

 <p>CDMX CIUDAD DE MÉXICO</p>	 <p>iMADRID!</p>	 <p>The City of SAN DIEGO</p>
 <p>NYC</p>	 <p>CITY OF MELBOURNE</p>	 <p>waze</p>
 <p>Ajuntament de Barcelona</p>	 <p>City of Philadelphia</p>	 <p>HARRIS COUNTY TEXAS</p>



Thousands of business  
decisions are still based  
on census data

United States	9 years ago
United Kingdom	8 years ago
Spain	8 years ago
Australia	3 years ago
Japan	4 years ago
Canada	3 years ago
Germany	8 years ago
Italy	8 years ago

7

Year

Average

Weighted by population



90% of people have their  
phone within 1M reach 24  
hours a day

# Mobile Data is Booming...



5bn

More than 5 billion people are calling, texting, tweeting and browsing on mobile phones worldwide



18x

Mobile data traffic has grown 18-fold over the past 5 years



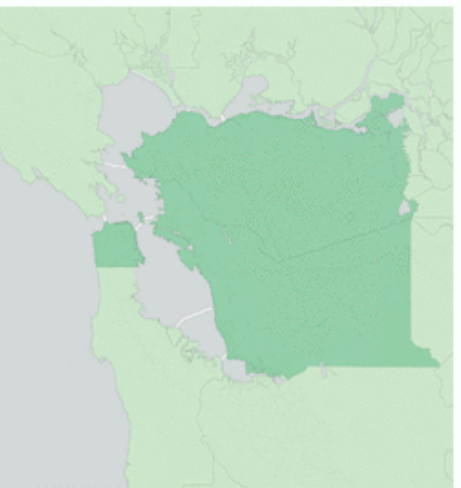
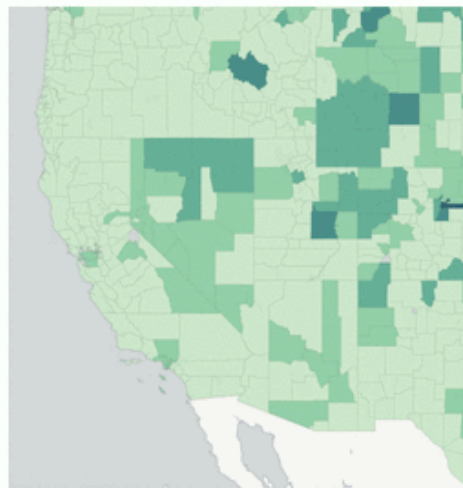
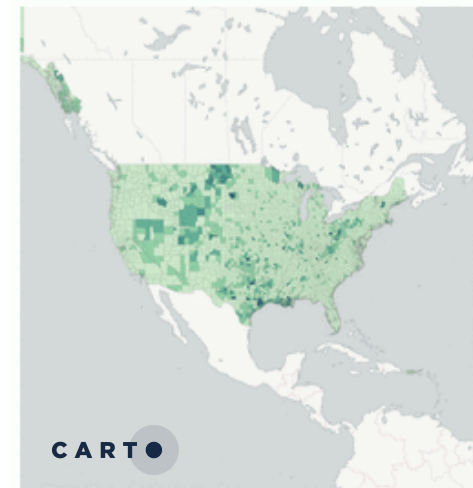
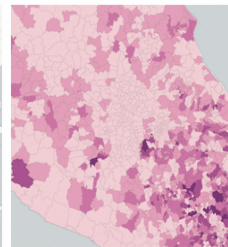
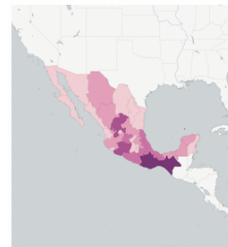
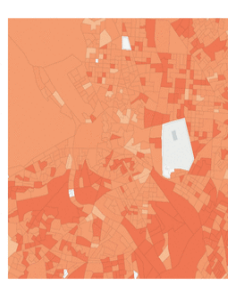
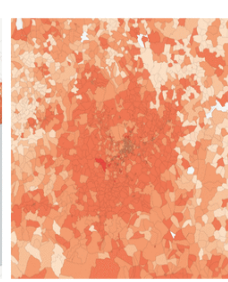
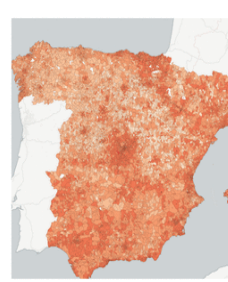
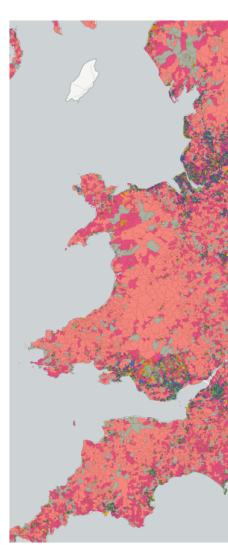
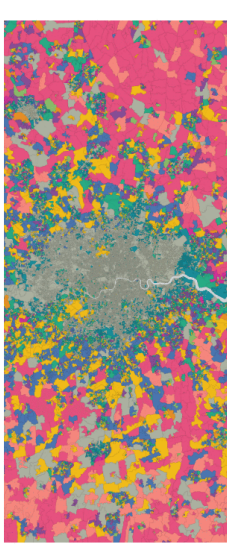
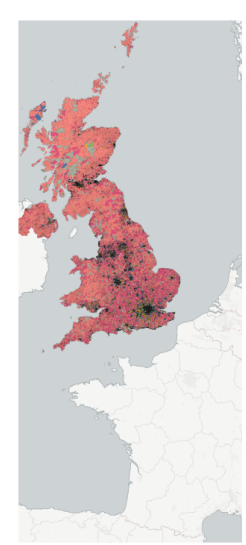
11.6bn

There will be 11.6 billion mobile-connected devices by 2021



# Location Data Brings Context to Mobile Data

Huge opportunity to expand Location Intelligence to new organizations that are now getting ready to be location aware.





NUMBER OF VISITORS MARCH 2019

8,161,640

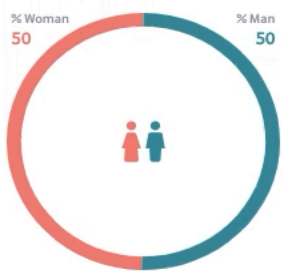
MAP LEGEND

Number of visitors



A visitor will be considered someone whose presence has been detected in a neighbourhood which is not his/her residence.

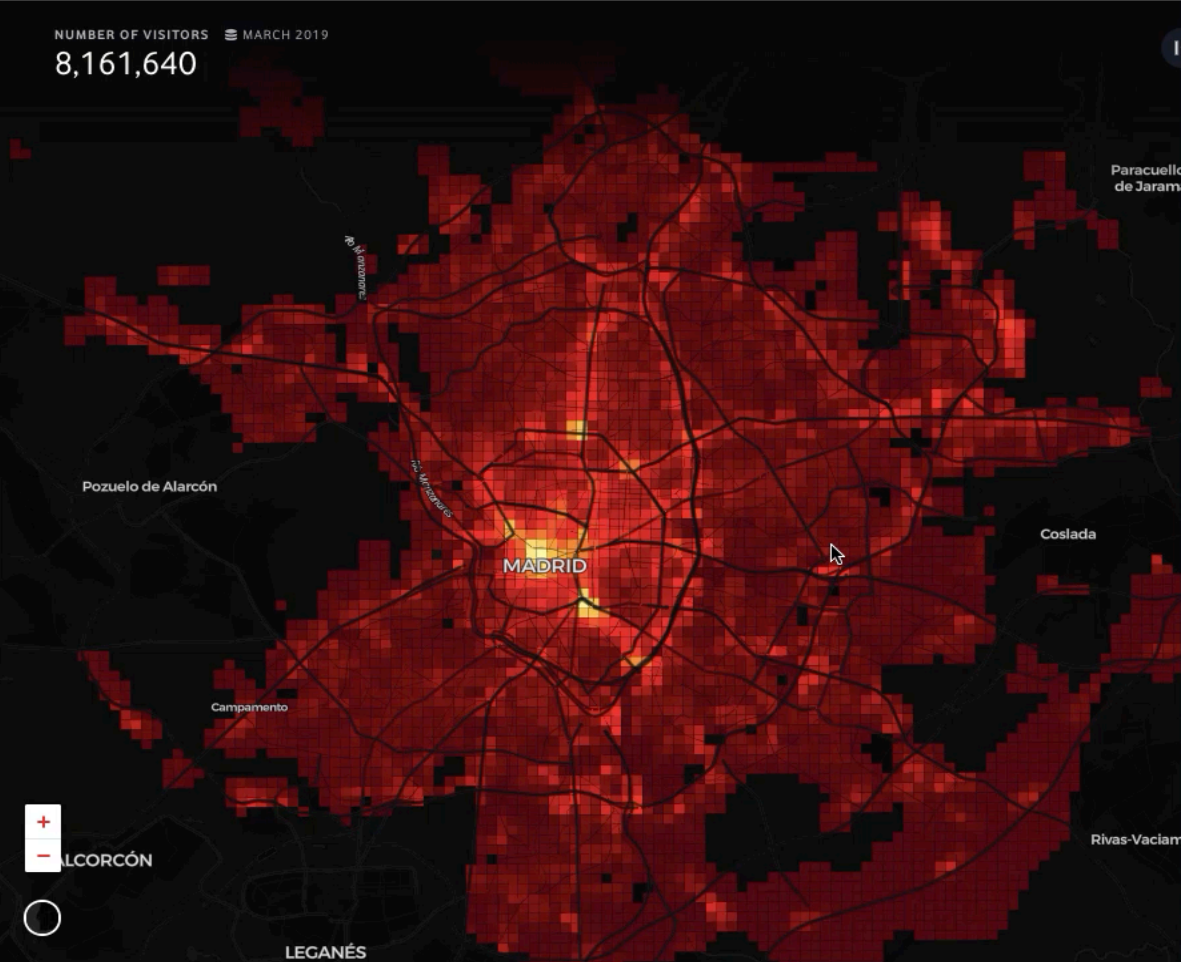
GENDER DISTRIBUTION (%)



POPULATION DISTRIBUTION (%)



% by Age ranges, both genders



DELIVERIES

March 2019

Temporal compar...

FILTERS

DAYS

All Week

Weekday

Weekend

HOURS

All Day

Morning

Afternoon

Evening

Night

TARGET

Entire population



The entire population will be considered all residents, commuters or tourists, and without making any distinction between gender or age. If you want to refine your query by these basic targets, uncheck this option.

# Privacy by design

Multiple mechanisms in place to preserve our customers' privacy and to ensure we are 100% GDPR compliant



Network events collection




**1.**  
Data anonymization



Vodafone Big Data Platforms

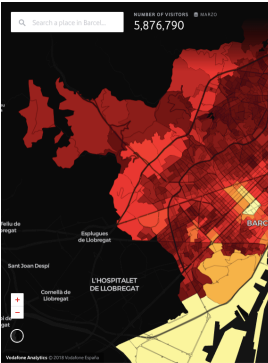
**2.**  
Opt-Out  
removal



**3.**  
Data  
aggregation

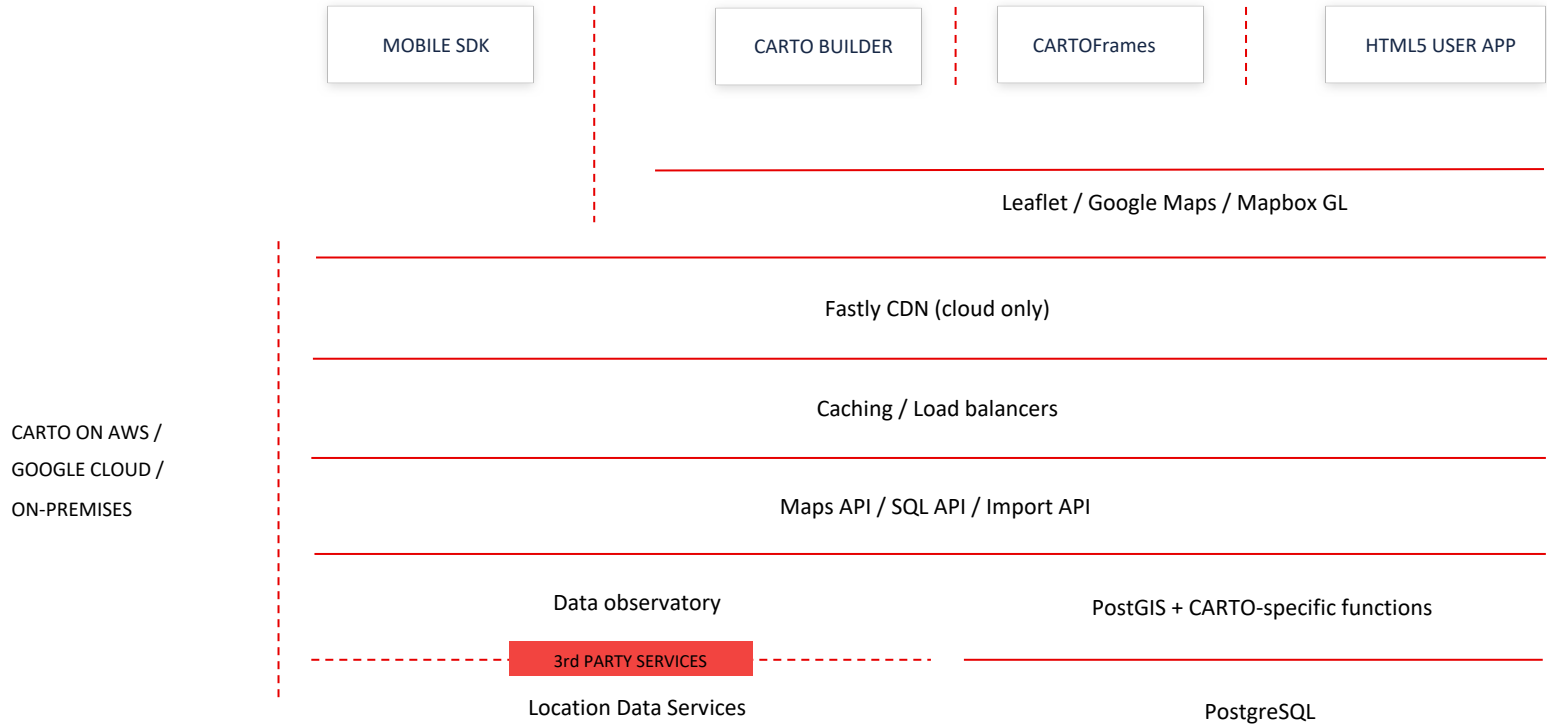


Vodafone Analytics



No data is used to locate or contact individuals

# CARTO stack



# Vodafone Analytics starts by bringing value to 4 key verticals



Retail



Tourism



Outdoor Media  
(OOH)



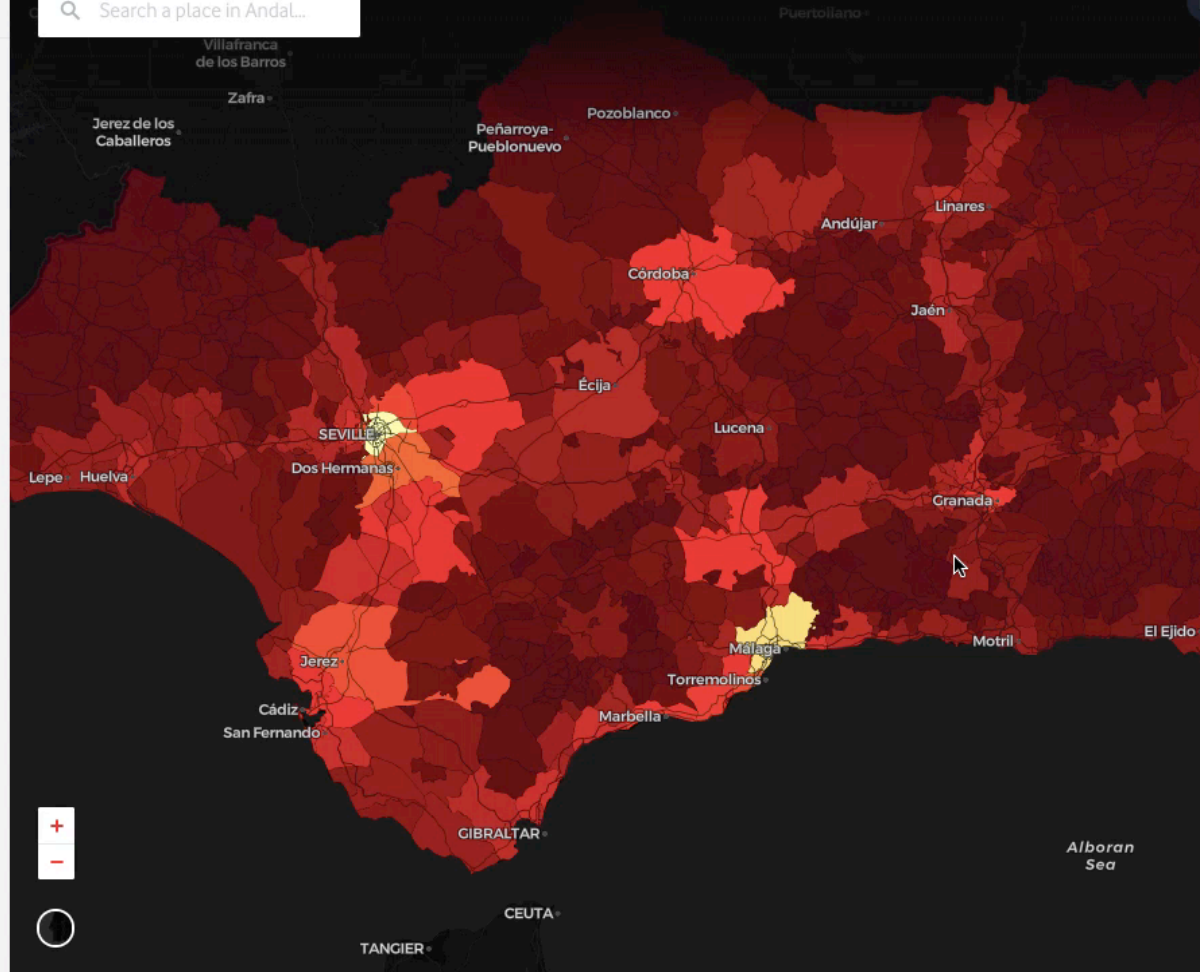
Mobility

# Answering key questions



Home icon, Location pin icon, Map Legend, Number of visitors, 166 to 2,835,973, A visitor will be considered someone whose presence has been detected in a neighbourhood which is not his/her residence, Tourism logo, Vodafone logo

Search a place in Andalu...



DELIVERIES, Sep 19, Temporal compari..., FILTERS, DAYS, All Week, Weekday, Weekend, HOURS, All Day, Morning, Afternoon, Evening, Night, TARGET, Entire population, The entire population will be considered all residents, commuters or tourists, and without making any distinction between gender or age. If you want to refine your query by these basic targets, uncheck this option.



It is time to move from  
visualizing data on maps to  
analyzing data using maps



# Where?

Where are tourists staying and going to?

You're likely using a BI platform



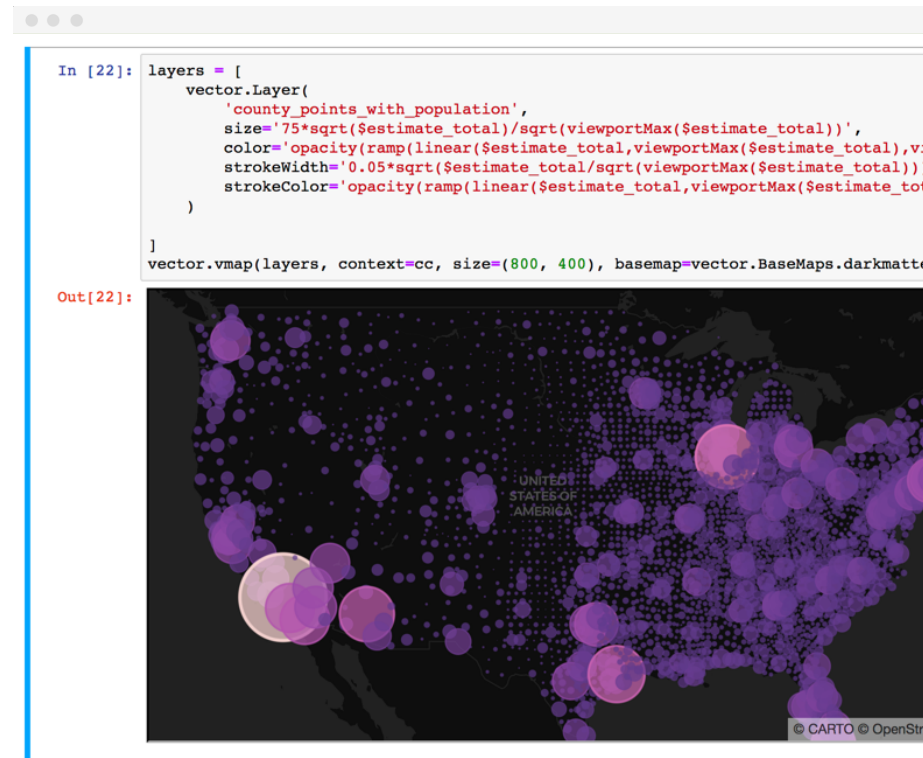
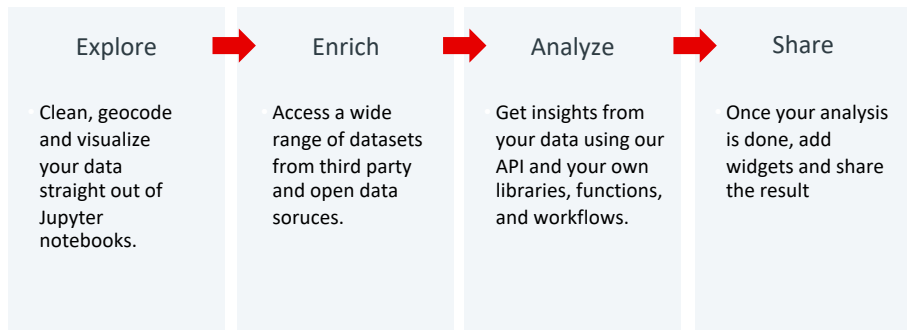
# Why?

Can we model the patterns and movements of tourists to improve operational efficiencies?

You need to use an LI Platform

# CARTO Frames and Data Observatory 2.0

A Python package for integrating CARTO maps, analysis, data services, and the CARTO Data Observatory into your data science frameworks, including Pandas and Jupyter Notebooks.



## Fusing multiple data streams to find twin areas between cities

$$d(\mathbf{Y}_{origin}, \mathbf{Y}_{target}) = \sqrt{\sum_j \left( Y_{origin}(j) - Y_{target}(j) \right)^2}$$

With some caveats:

1. Different variances?
2. Correlated variables?
3. Missing data?
4. When is a distance small enough? Or how to define similarity?



Out[3]:



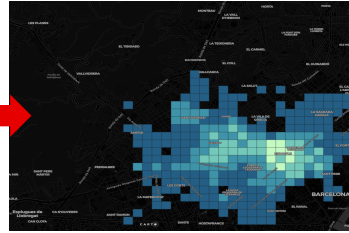
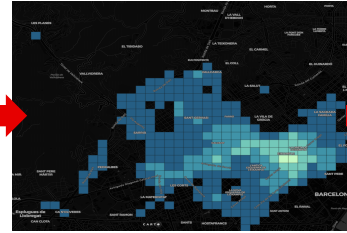
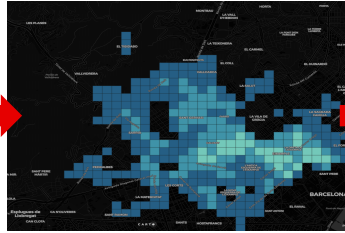
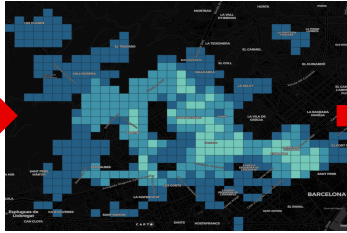
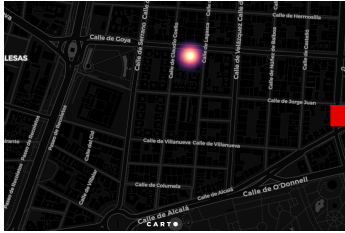
Let's see a summary of the data available for the region of **MADRID** for a given spatial resolution: providers and packages (DO)

```
In [4]: mad = regions[1]
spatial_resolutions = ['305 meters']
providers = mad.list_providers(spatial_resolutions=spatial_resolutions)
providers_df = entities2df(providers)
providers_df[['description', 'id', 'name']].sort_values(by='id')
```

Out[4]:

	description	id	name
8	Open demographics data from CARTO Data Observa...	1	CARTO
0	Unica360 demographics data for Spain	2	Unica360

# C/Goya in Madrid



Demographics

Demographics

Vodafone Analytics

Demographics

Vodafone Analytics

Road Traffic

Financial

Demographics

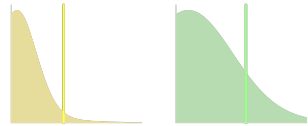
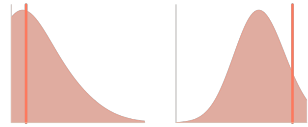
Vodafone Analytics

Road Traffic

Financial

Points of Interest

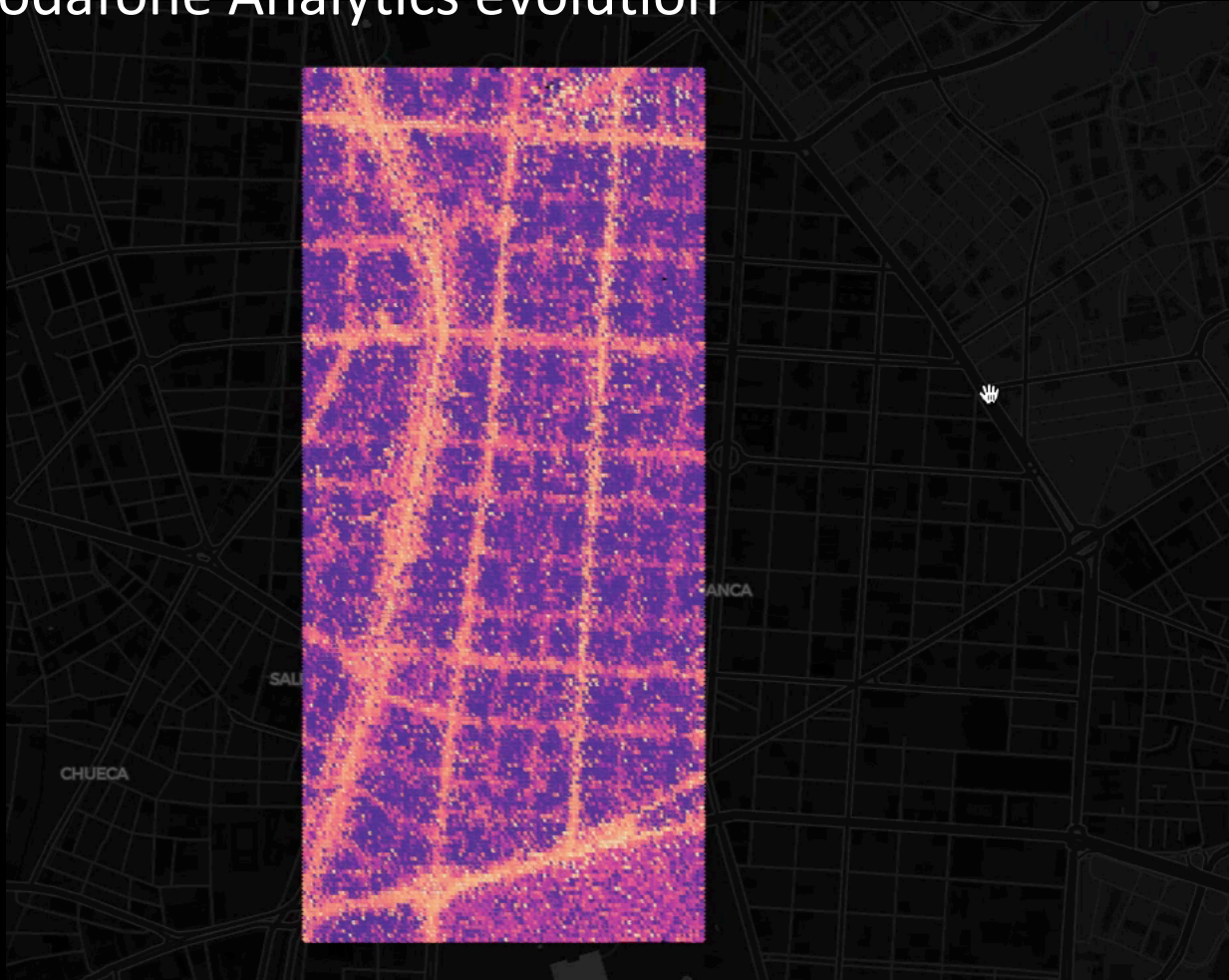
POPULATION HOUSEHOLD INCOME



VISITORS

TRANSACTIONS

# Vodafone Analytics evolution



## Day of Travel

All selected	
Thursday	172.3K
Friday	171.2K
Wednesday	169.3K
Tuesday	167.7K
Monday	163.1K
Saturday	147.8K

## Time of Travel

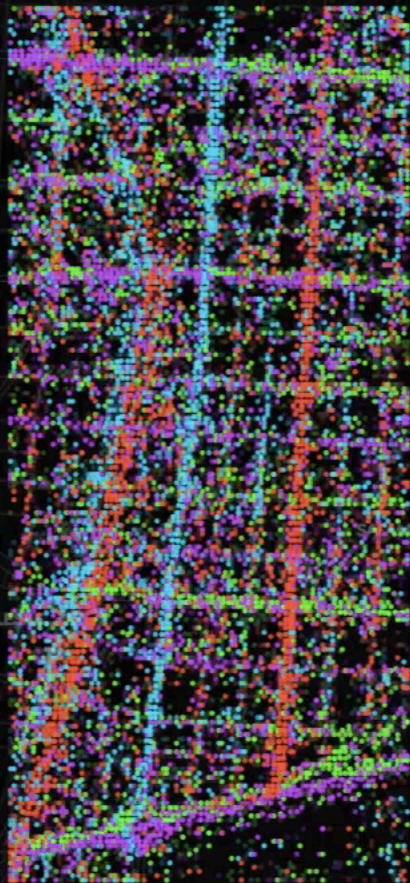
All selected	
Midday	366.0K
Morning	290.3K
Night	239.1K
Evening	230.3K

## Direction of Travel

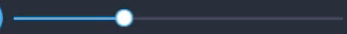
All selected	
W	187.1K
S	173.6K
E	171.7K

### Direction of Travel

- N
- S
- E
- W



### Trip Time



2019-09-03T07:20:59.760Z

**CARTO** ●

The logo for Carto features the word "CARTO" in a bold, dark blue, sans-serif font. The letter "O" is replaced by a solid dark blue circle. This circle is centered within a larger, light gray circle that serves as a background for the "O".