Optimizing Grocery Delivery Logistics

DATA ANALYSIS

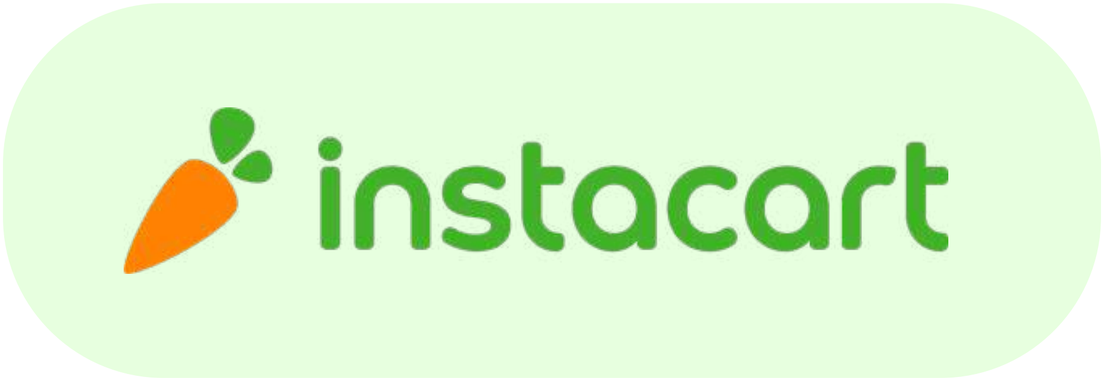
When do people place their orders?

- Are there daily or weekly patterns in shopping behavior?
- How does grocery delivery demand match up with traffic conditions?

What can we learn about the way people order their groceries?

- How often do people order groceries?
- Which products are most ordered/reordered?

3 MILLION ORDERS FROM



206209 USERS • 49677 PRODUCTS

6 DATASETS

orders.csv

orders and when they are placed

products.csv

product names, numbered starting from 1

order_products__prior.csv

orders with corresponding products

order_products__training.csv

training dataset with same info as order_products__prior.csv

departments.csv

department names, numbered starting from 1

aisles.csv

aisle numbers, numbered starting from 1

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orders.csv

- order_id
- user_id
- order_number
- order_dow
- order_hour_of_day
- days_since_prior_order

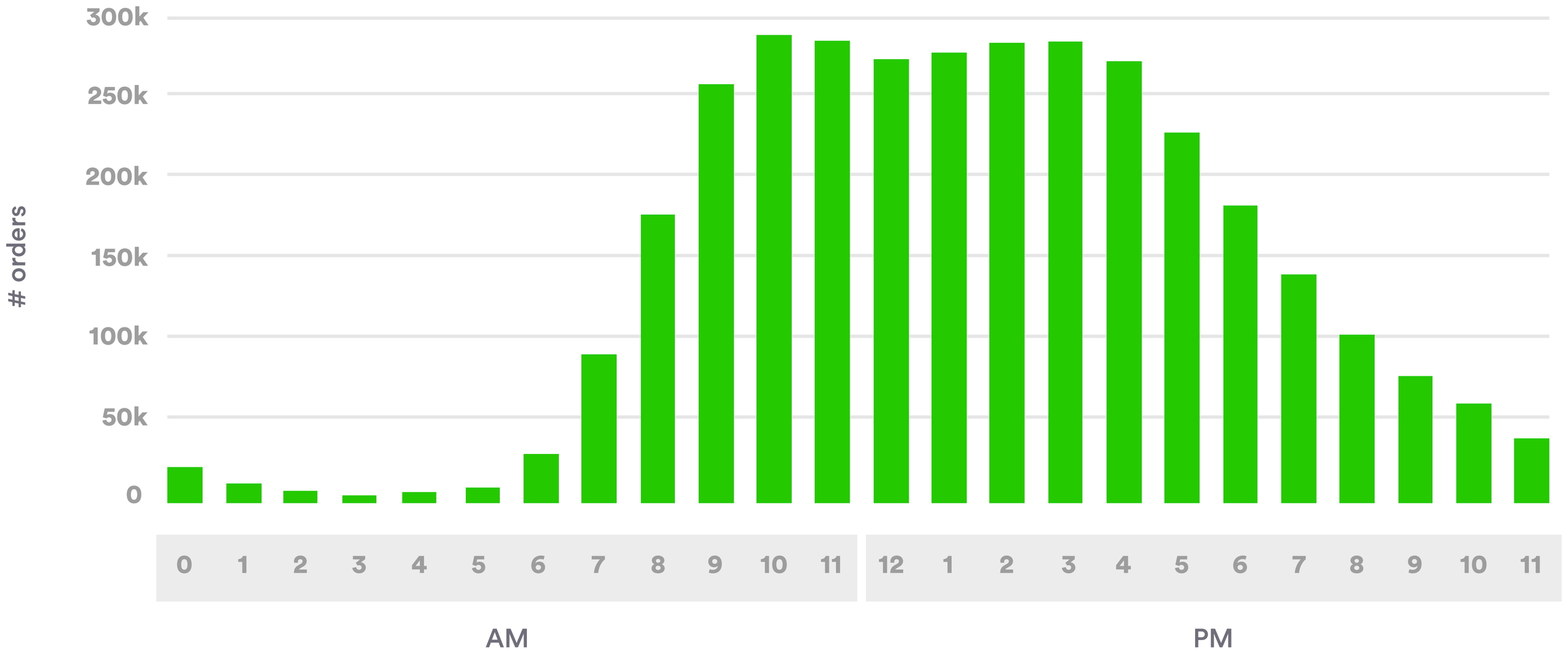
order_products__prior.csv

- order_id
- product_id
- add_to_cart_order
- reordered

products.csv

- product_id
- product_name
- aisle_id
- department_id

Order volume by hour of day



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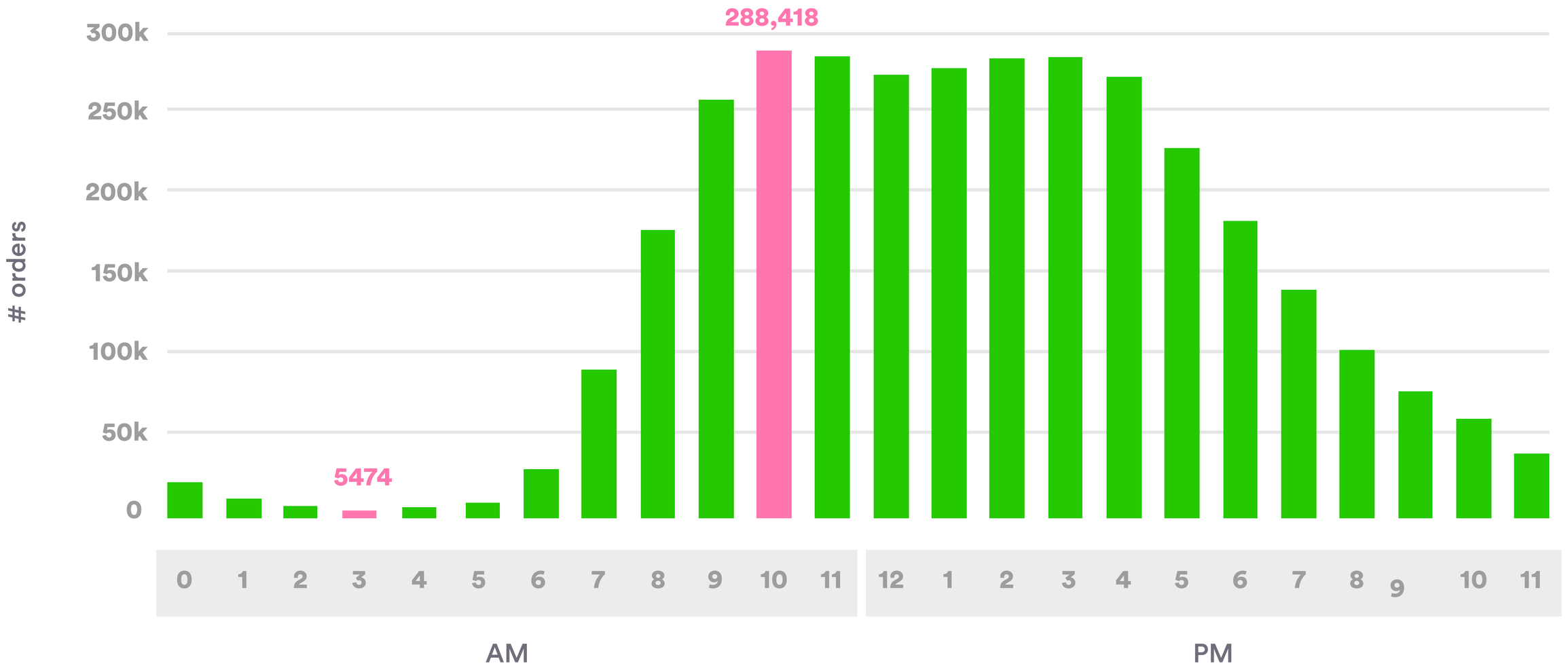
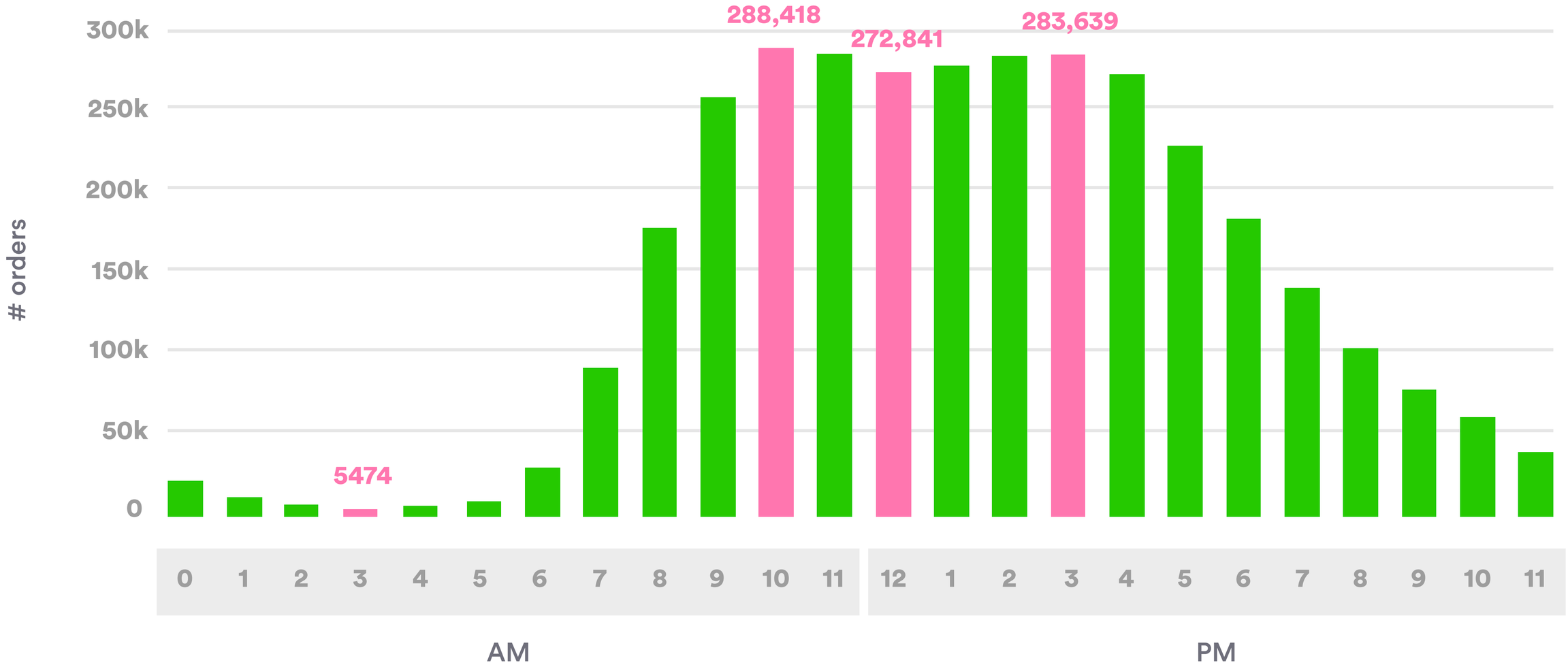
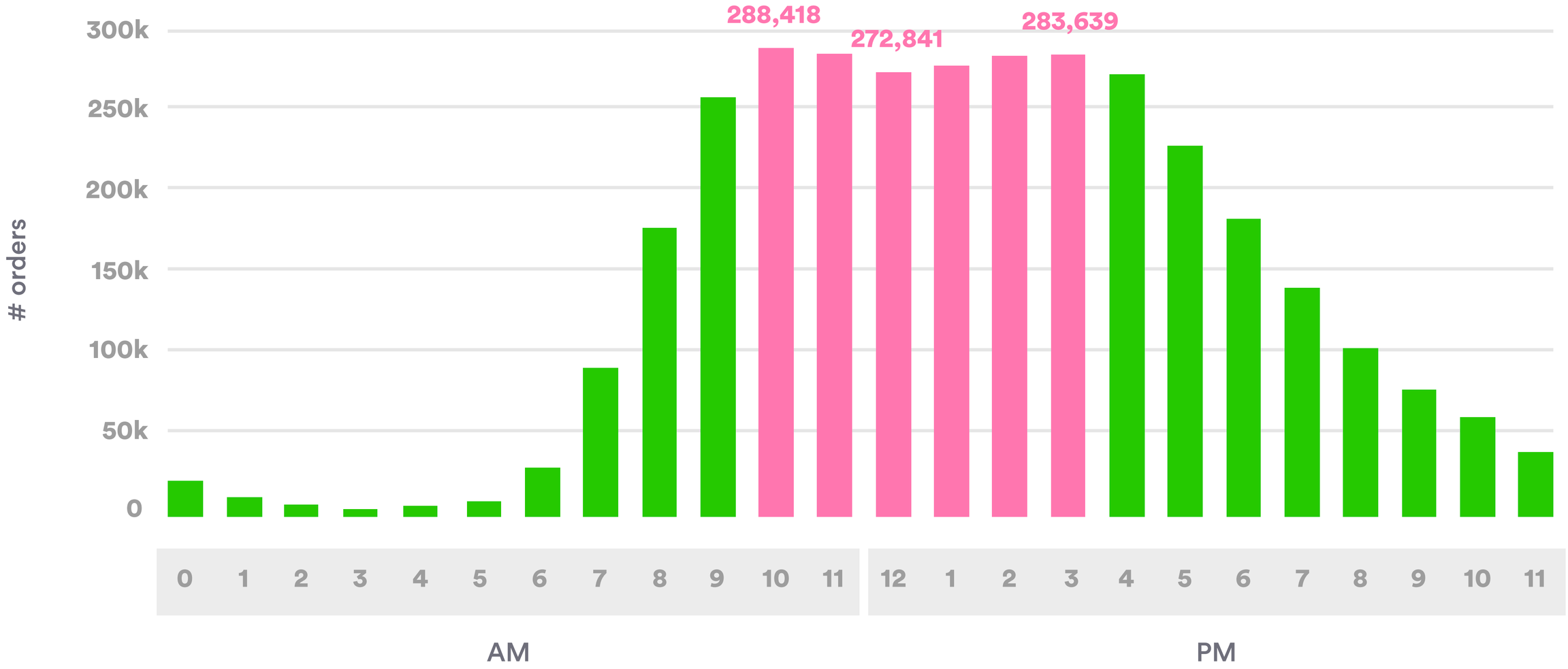


Order volume by hour of day -causes?



local mins/max · points at which slope changes from (+ to -) or (- to +)

Order volume by hour of day



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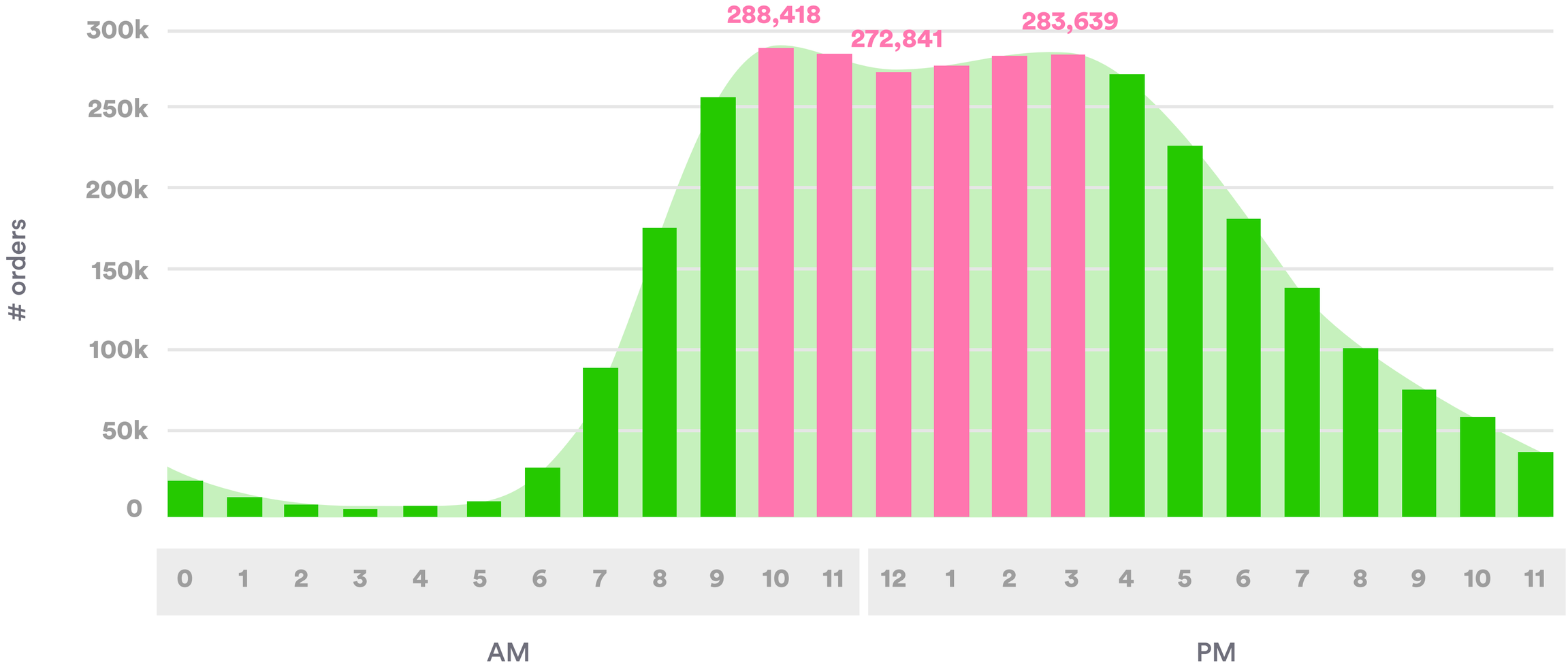
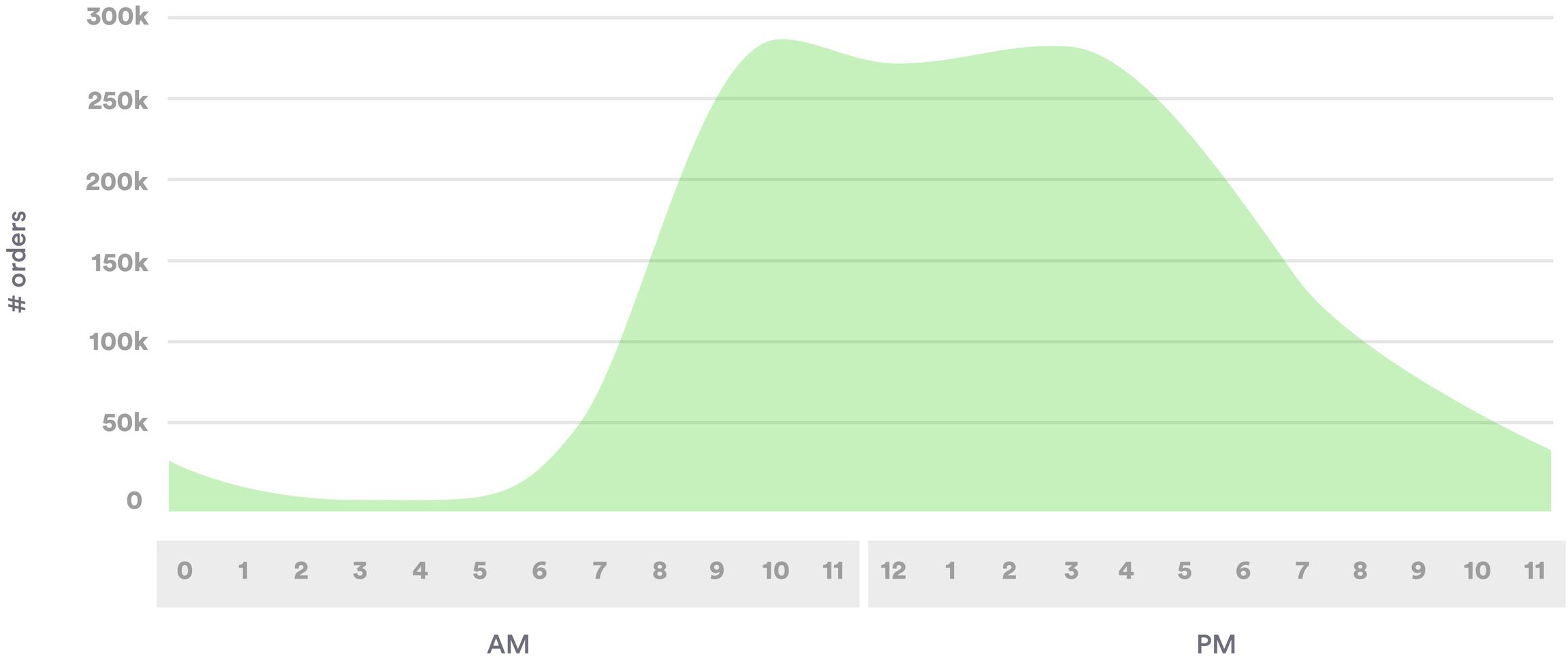
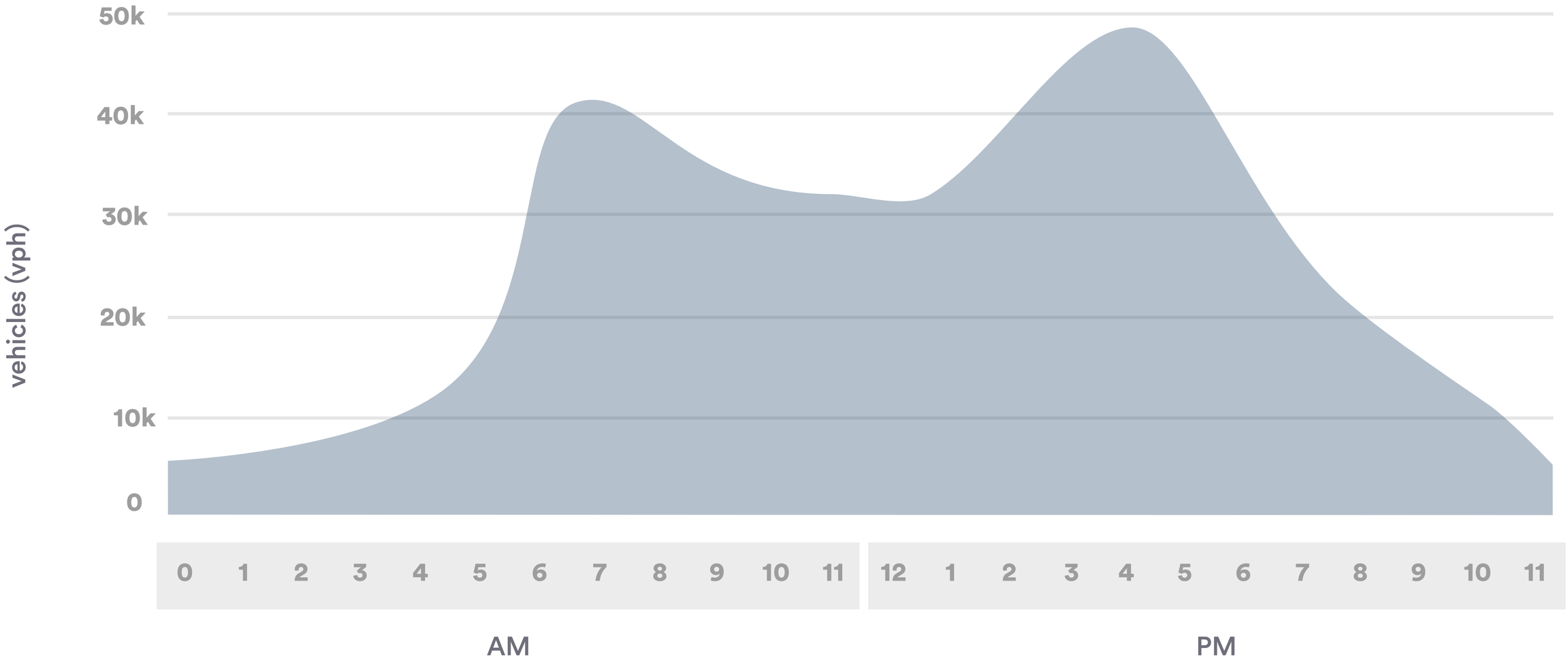


Order volume by hour of day

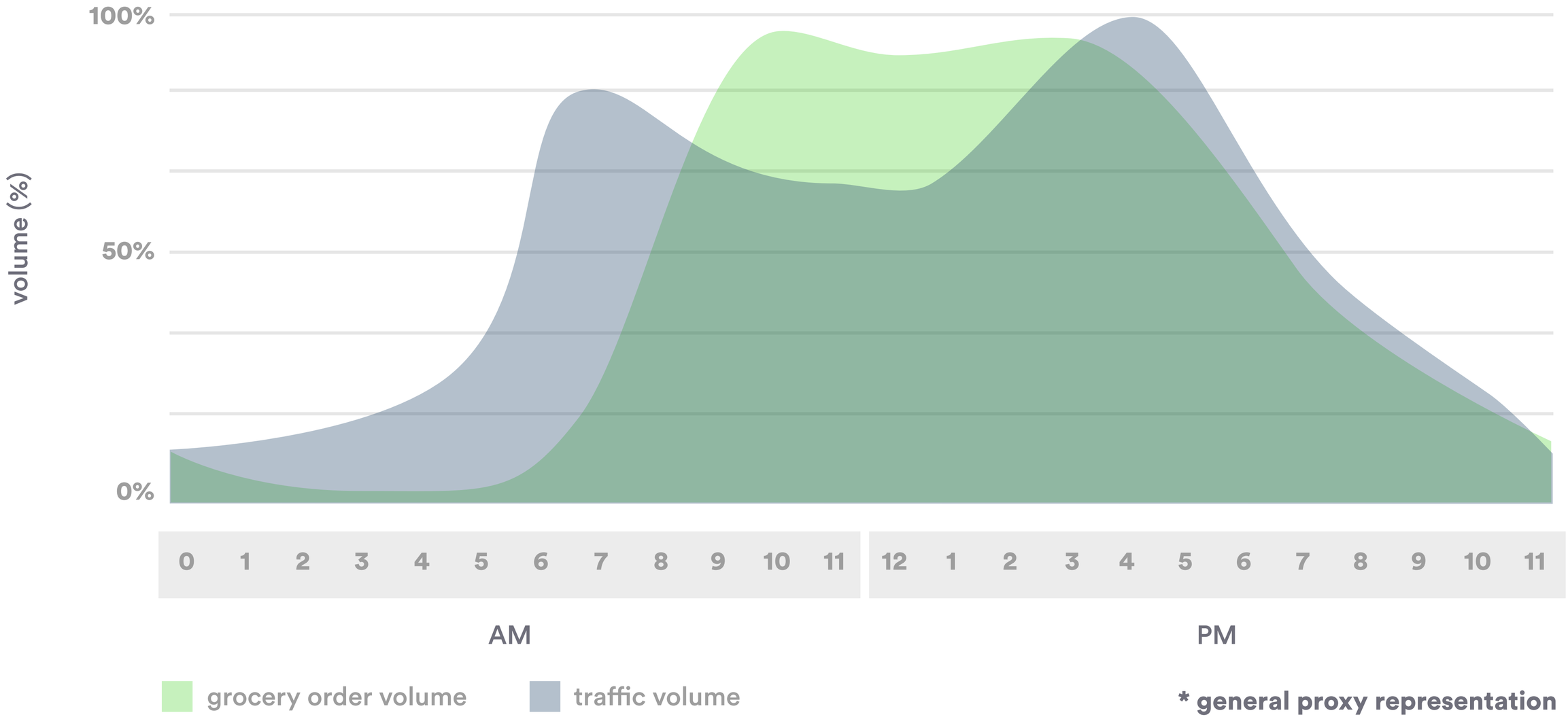


Road traffic volume by hour of day



source: The Scientific World Journal - estimated average across the US

Grocery orders + Road traffic volume



*** general proxy representation**

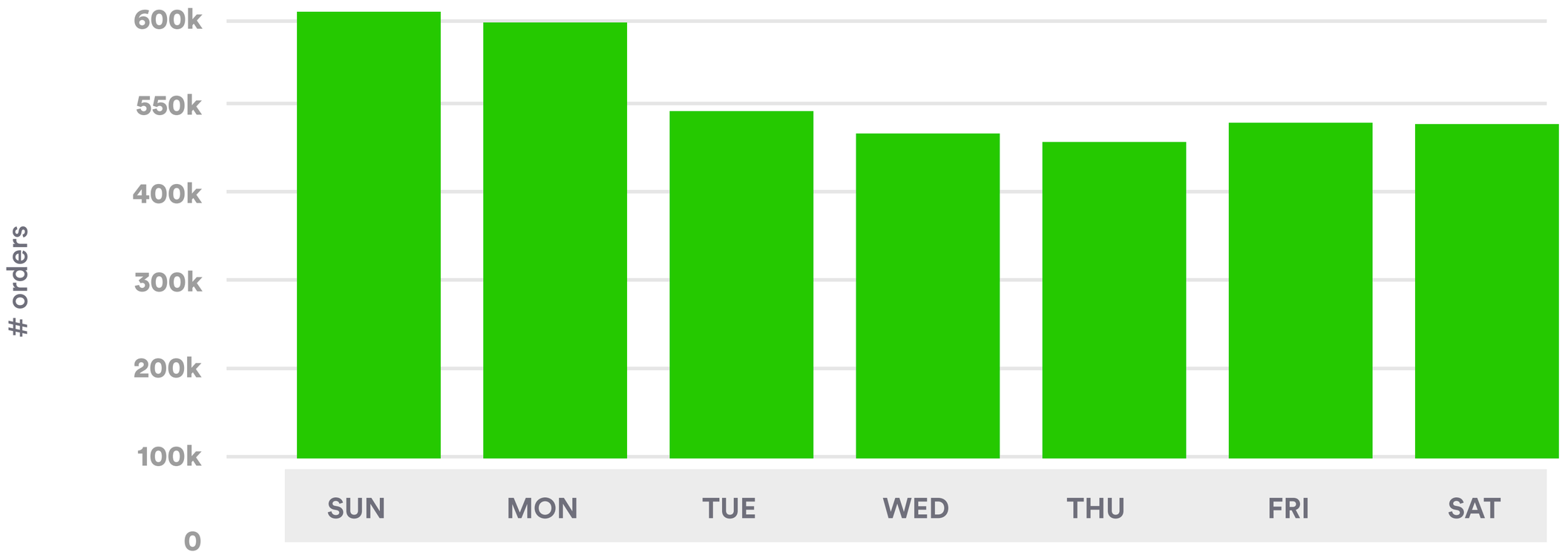
Insight

- Grocery delivery order volume and road traffic volume have opposite peaks, but become similar near evening time.

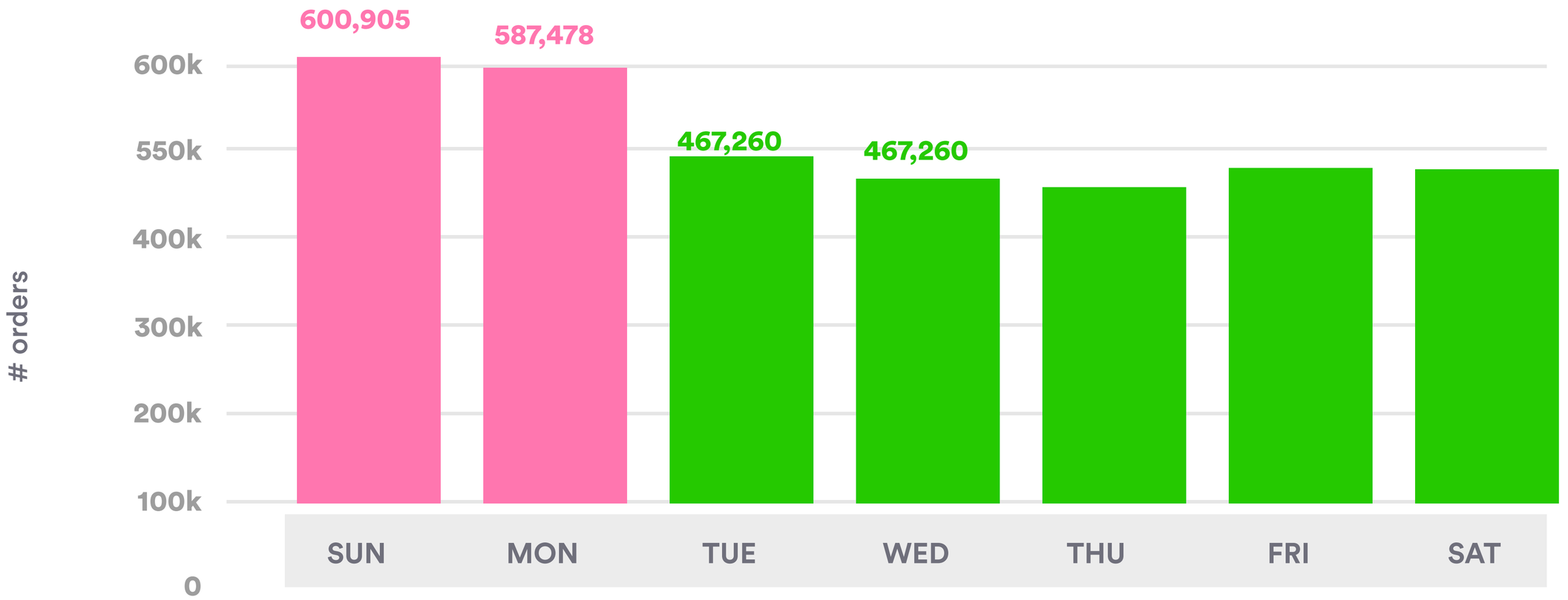
Application

- This data can be used predict when people will order and how long it will take people to recieve their orders based on what time of day they're ordering.
- Beating road traffic is a good argument for autonomous delivery bots, which would avoid road traffic by using sidewalks (would be subject to sidewalk traffic constraints)

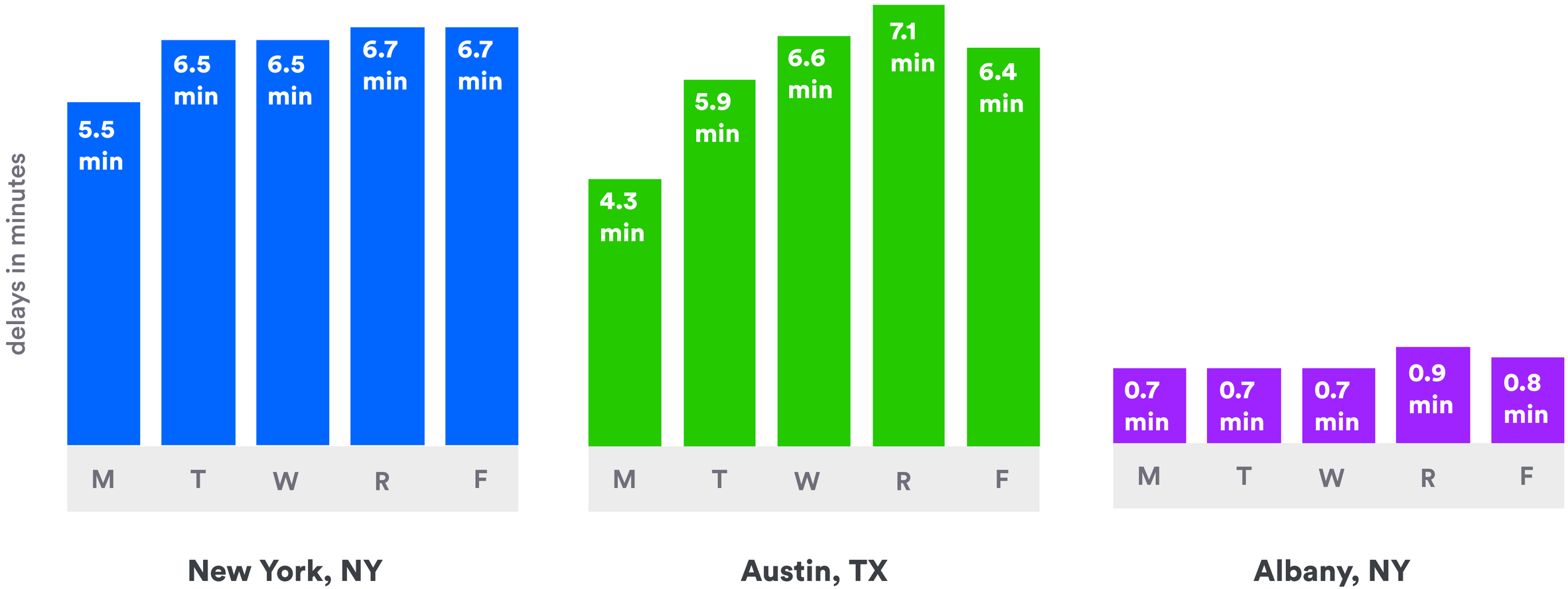
Order volume by day of week



Order volume by day of week



Delay, in minutes, for a one-way trip taking 30 minutes with no traffic congestion



11.11

Average days since prior order

Most reordered items

Banana

Bag of Organic Bananas

Organic Strawberries

Organic Baby Spinach

Organic Hass Avocado

Organic Avocado

Large Lemon

Strawberries

Limes

Organic Whole Milk

Insight

- Surprisingly, a large amount of produce is ordered rather than dry/pantry goods

Application

- This data could aid in a predictive analysis of what and when users will by, driving supply as well as offering suggestive experiences in-app.

- This could help to optimize supply chain logistics (i.e. if we know people order produce a lot, we know produce needs to be handled differently, we can anticipate needs ahead of time)

Future Analysis

Pinpoint drocery demand on a 24-hr basis throughout different days of the week (compare weekdays to weekends)

Analyze different cities/cohorts of cities (NYC vs SF, or urban vs suburban)

User cohorts - do people who order larger loads tend to order less often?

Is there a correlation between day of week and number of orders/number of products ordered??

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