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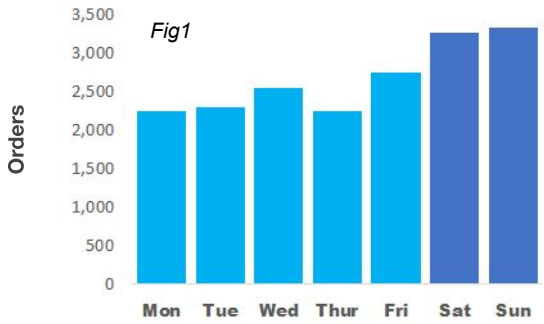
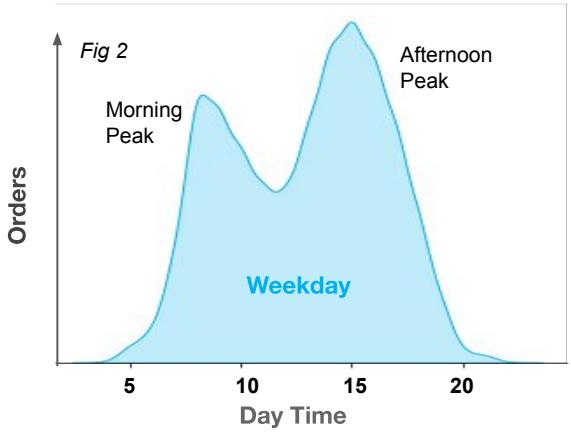
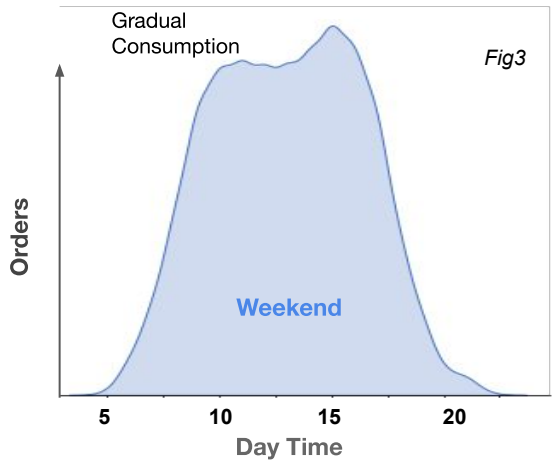
A Look into Day Dynamics and Peak Hours

Overview: The content of this report looks at a subset of Wolt orders from Aug to Sep 2020. Data was sourced through bitbucket at link: https://github.com/woltapp/data-science-summer-intern-2021

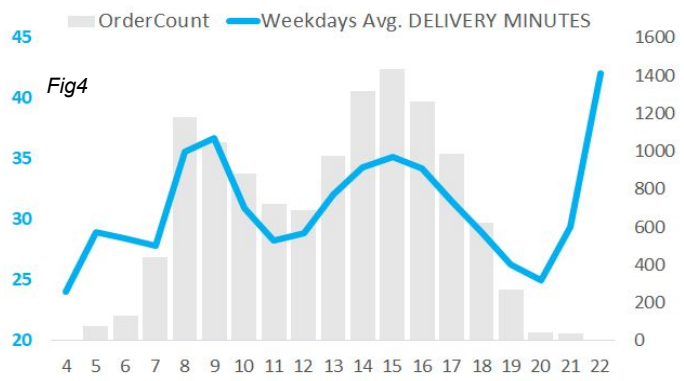


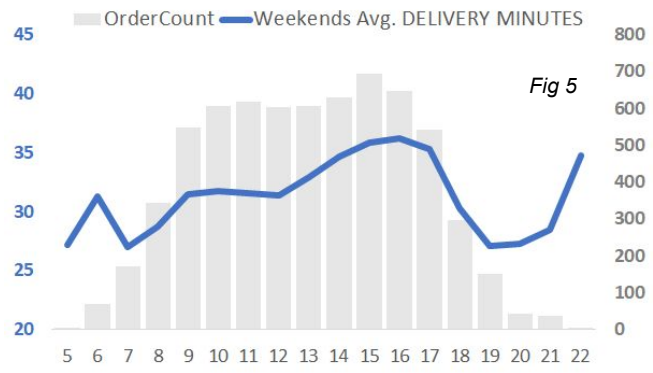
Day Dynamics: Saturdays and Sundays have a higher amount of orders with a more gradual and stable consumption throughout the day (fig 3). When looking at weekdays, there are two distinct peaks: morning and afternoon (fig 2). Through the rest of the report we will pay close attention to the weekday and weekend segmentation.

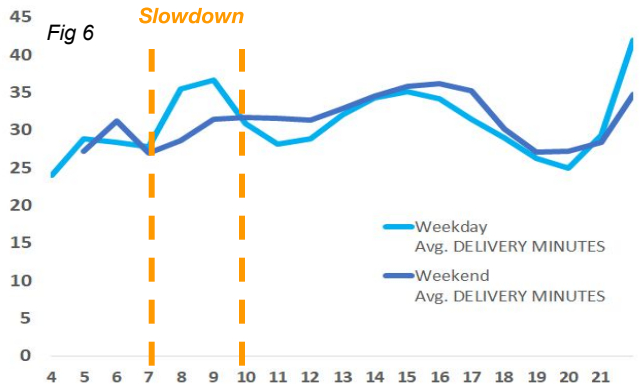


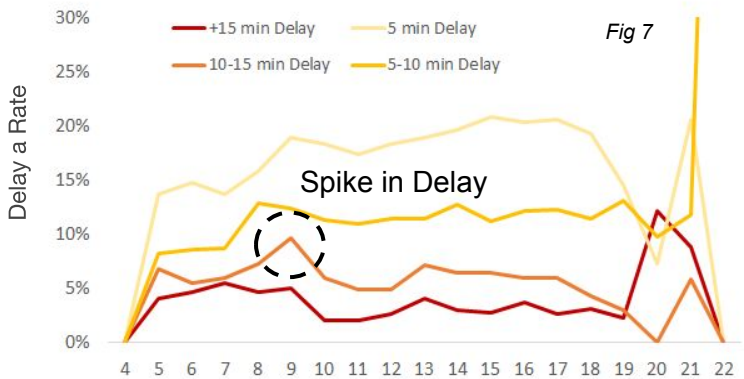


A Closer Look at Peak Hours: Weekday delivery time slows down from 8-9 AM during the Morning Peak *(fig 4)*. When comparing to the Afternoon Peak, that has higher order volume, delivery time is still higher *(fig 4)*. Comparing against the weekend, the morning delay is even more visible (fig 5 and 6). We can assume that morning traffic rush hour is having an effect during the week. The slowdown window presents an area to drive efficiencies. A potential solution is to optimize restaurants presented to consumer through distance ranking.









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Potential Areas Impacting Delay

Rain: At an overall level, a marginal impact of 4 additional minutes can be attributed to the effects of rain *(fig 8)*. Overall taking into account rainy days does not present a big overall shift to efficiencies. During Aug and Sep 2020, only **5 %** of orders occurred during heavy rain and **4%** occured during light rain.

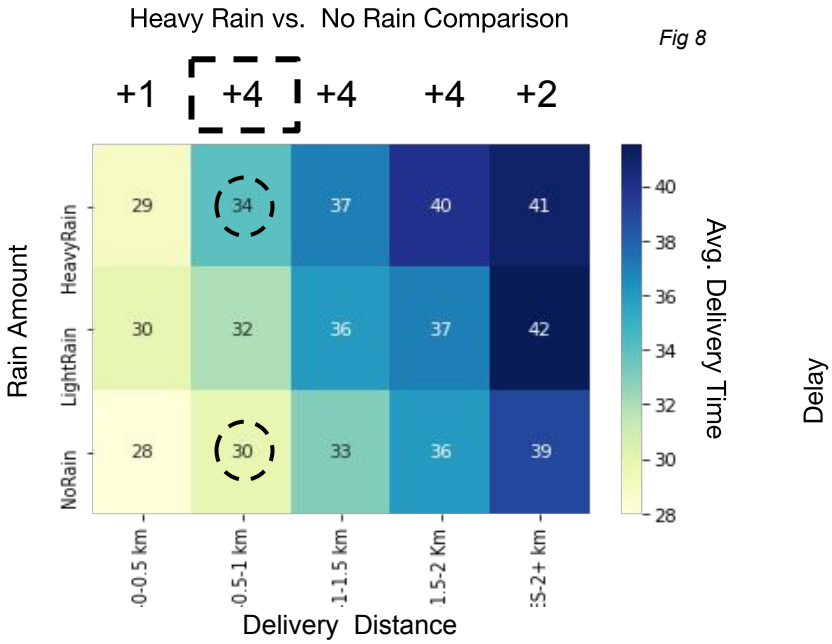

Fig 8

Distances: No clear impact is observed between delivery distance and delivery delay *(estimated delivery time - actual delivery time)*. We observe similar volatility across distances (*fig 9).* However being late on short trip vs. a long trip should be considered differently. For example, a delay of 10 minutes in a short tip vs. long trip would be interpreted differently by a consumer. There is a need to understand why there is so much volatility on short distance trips (less than 0.5 KM). Short distance trip account to **37 %** of orders received in Aug and Sep 2020.

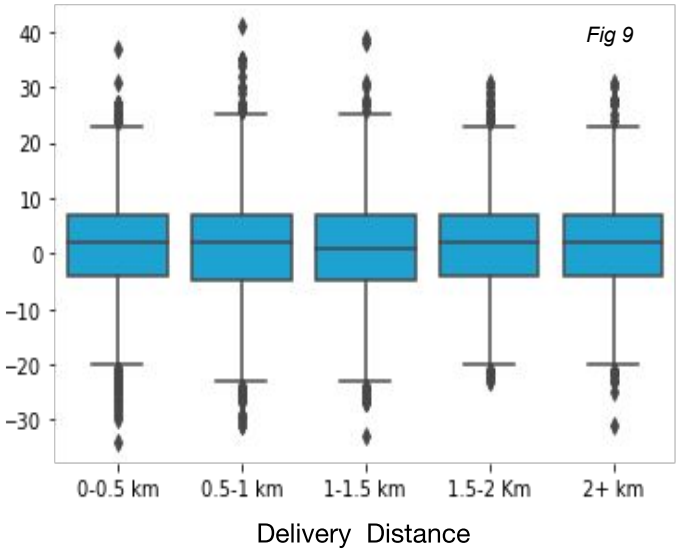

Fig 9

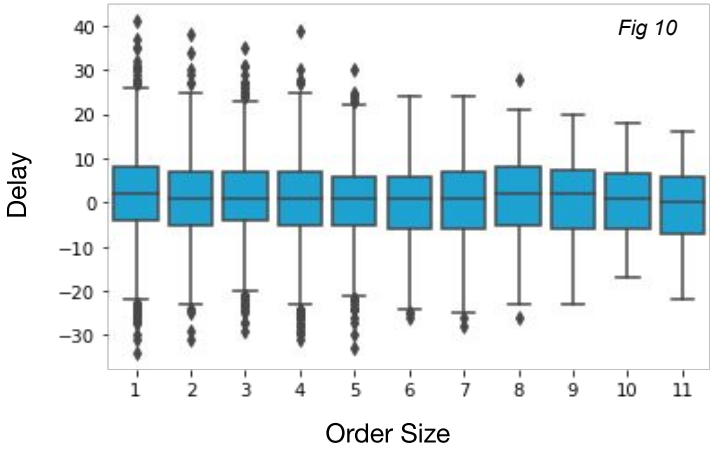

Fig 10

Order Size:

The overall order size (number of items in the delivery order) is not a strong indicator of potential delay *(fig 10)*. Likely if we would expand the exercise to account for wait time at restaurant, we could observe the effect of order size driven by prep time. This would given us an indication of overall wait time for the app user.

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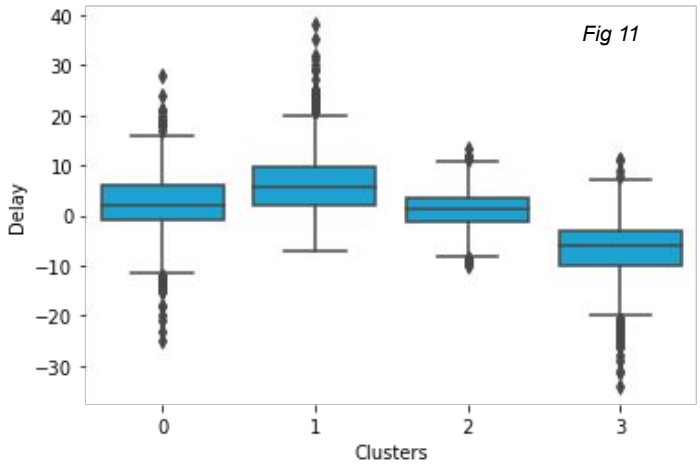
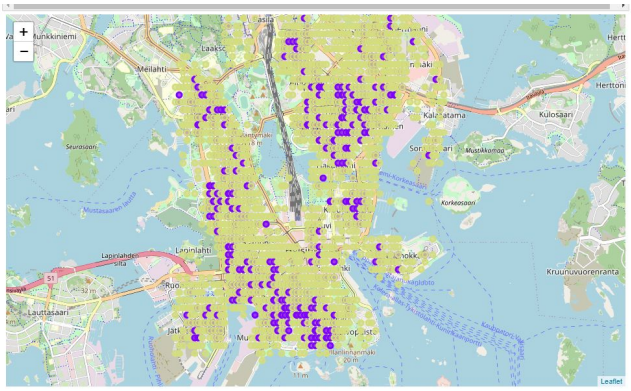
User Clusters

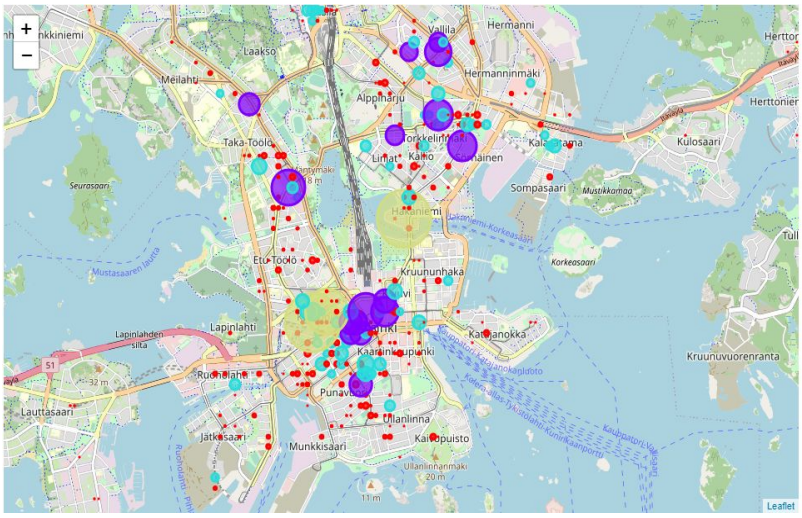
USER CLUSTERS:

Looking at cluster 1 to determine if there is any variable that stands out. We don't see any particular variable be a key driver for cluster 1 to have high delay.



Mapping cluster 1 (highest delay) to cluster 3 (lowest delay) in the map. This map below shows that there is no area that is dominant of cluster with high delay. Delay is not geo location dependent





Venue Clusters:

We can observe from the map that cluster 3 (highest orders) consists of 3 main geo locations in the city. These are significant centriods of distribution. Cluster 0 (low orders) tends to be spread out through the city. Looking at cluster 0 and cluster 3 compositions. Both clusters have Coffee Shops or Cafes at the top. What is interesting is that Scandinavian Restaurant is ranked high in Cluster 0 which is the cluster that is spread out. For cluster 3 which is more in the central area part of town, we start to see Middle Eastern type food higher than Scandinavian. To a certain extent, this shows the urbanity influences food options.

Conclusions:

Through the report, we gathered initial insights and identified the following opportunities to drive efficiencies:

- **Weekday Peak Hours (8:00-9:00 AM):** This time-slot is crucial both from an order volume and slowdown on delivery speed. We can't solve for traffic rush hour, however we can focus on optimizing routes by developing models/simulations to optimize the restaurant's list presented to consumers. Another aspect to explore is how mode of transportation plays an effect (bikes, scooters, or walking).
- **Leveraging Non-Peak Hours (10:00 AM-13:00 PM):** This time-slot presents a sizeable opportunity to diversify. During the time-slot, the volume order decreases while Wolt delivery associates are already up and running.
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- **The Volatility of Shop Trips:** Short distance trips account to 37 % of orders. A notable point to uncover is the high fluctuation in short trips. Getting further and more detailed information can help uncover the fluctuation drivers. Few metrics to consider (attempts delivery associate called user, wait time at the restaurant, # floors of the building, etc).
- **Geo Clusters:** Neighborhood clustering highlights there is no issue with a particular area driving the overall delay.