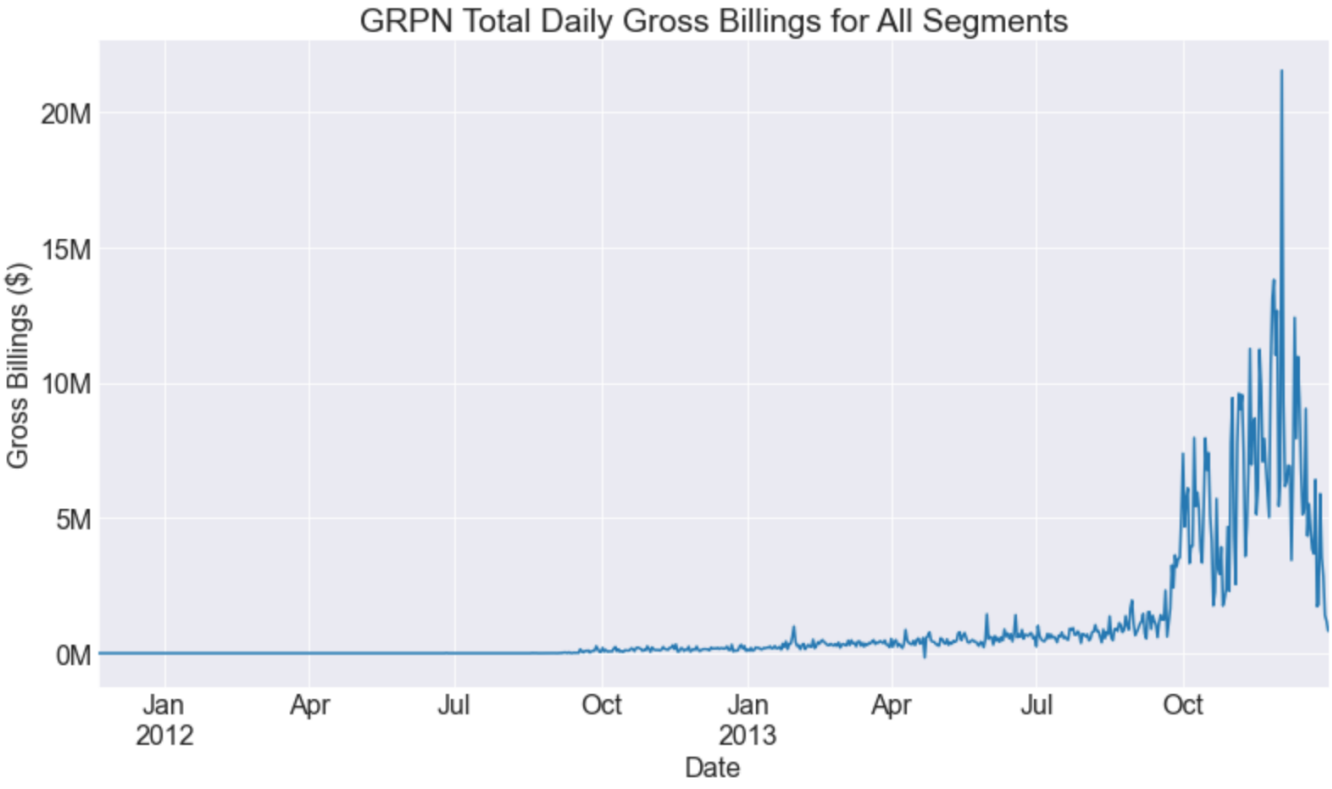
# GRPN Exercise

**My 4Q13 Gross Billings Estimate by Segment:**

| My Prediction | Q4 2013 | | |
|---|---|---|---|
| | Oct-13 | Nov-13 | Dec-13 |
| **Gross Billings ($ million)** | | | |
| Local | $102.3 | $101.8 | $67.0 |
| Goods | $62.5 | $115.0 | $98.8 |
| Travel | $20.2 | $25.1 | $22.7 |
| **Total** | **$185.0** | **$241.9** | **$188.5** |
| **Quarter Total** | **$615.40** | | |

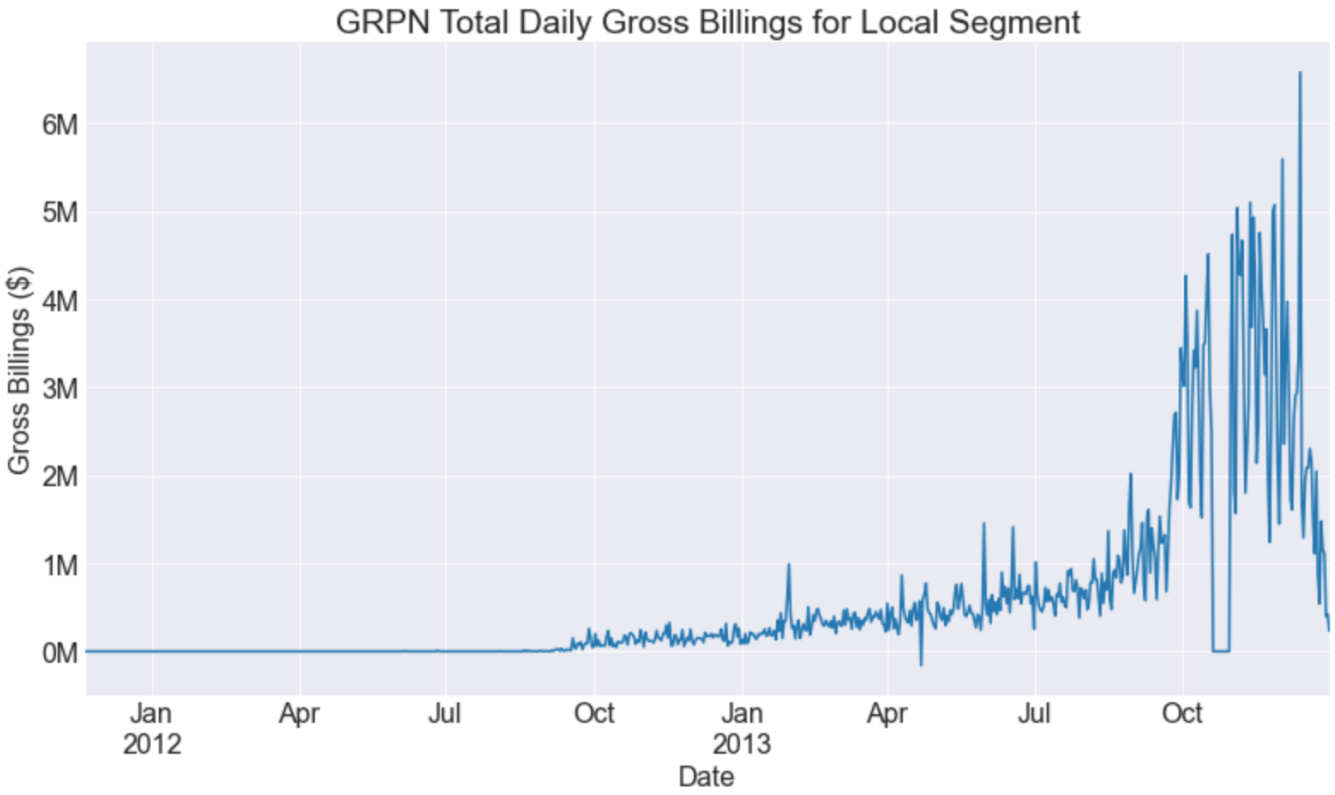
**Short description of how I arrived at this estimate (plots created precede each step/explanation):**

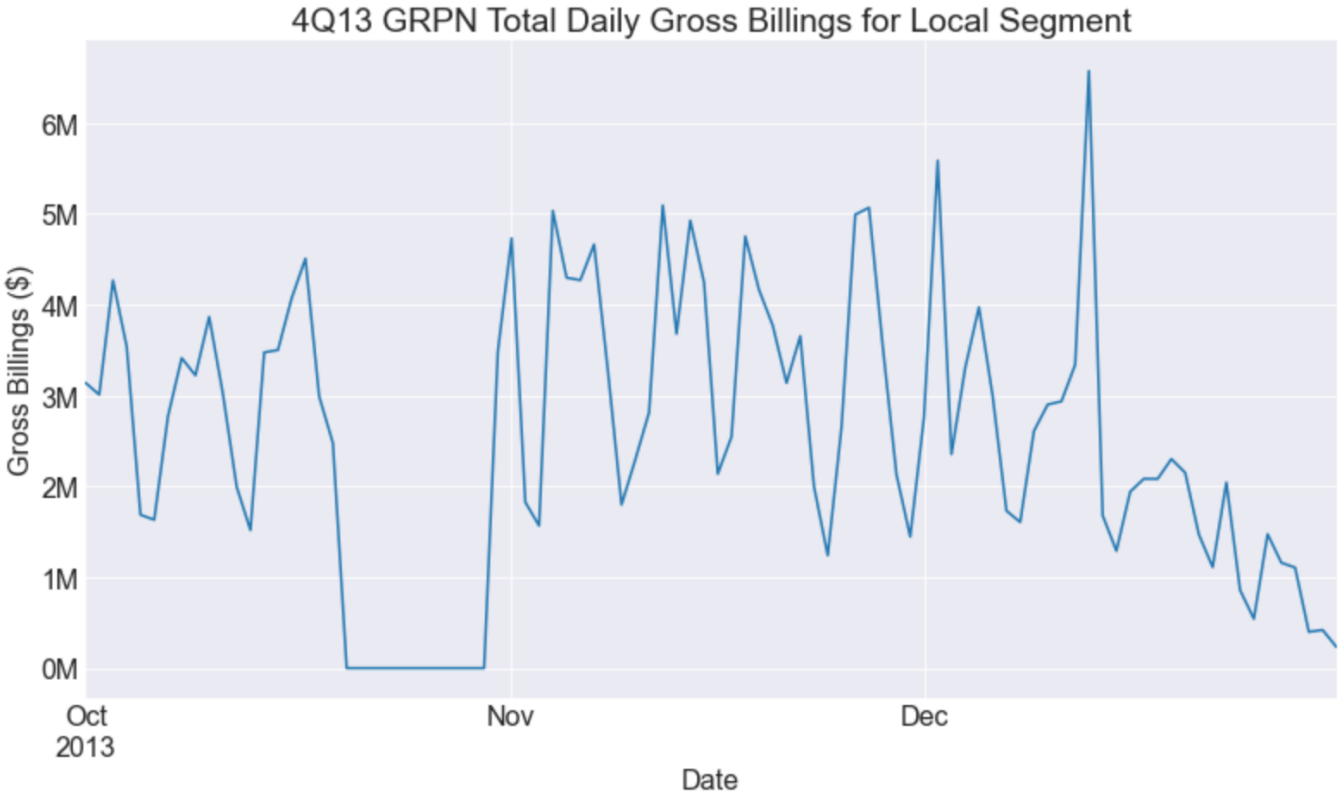



1. I resampled the raw data by day, took the total sales for each day across all segments, and visualized the data
    a. Takeaways:

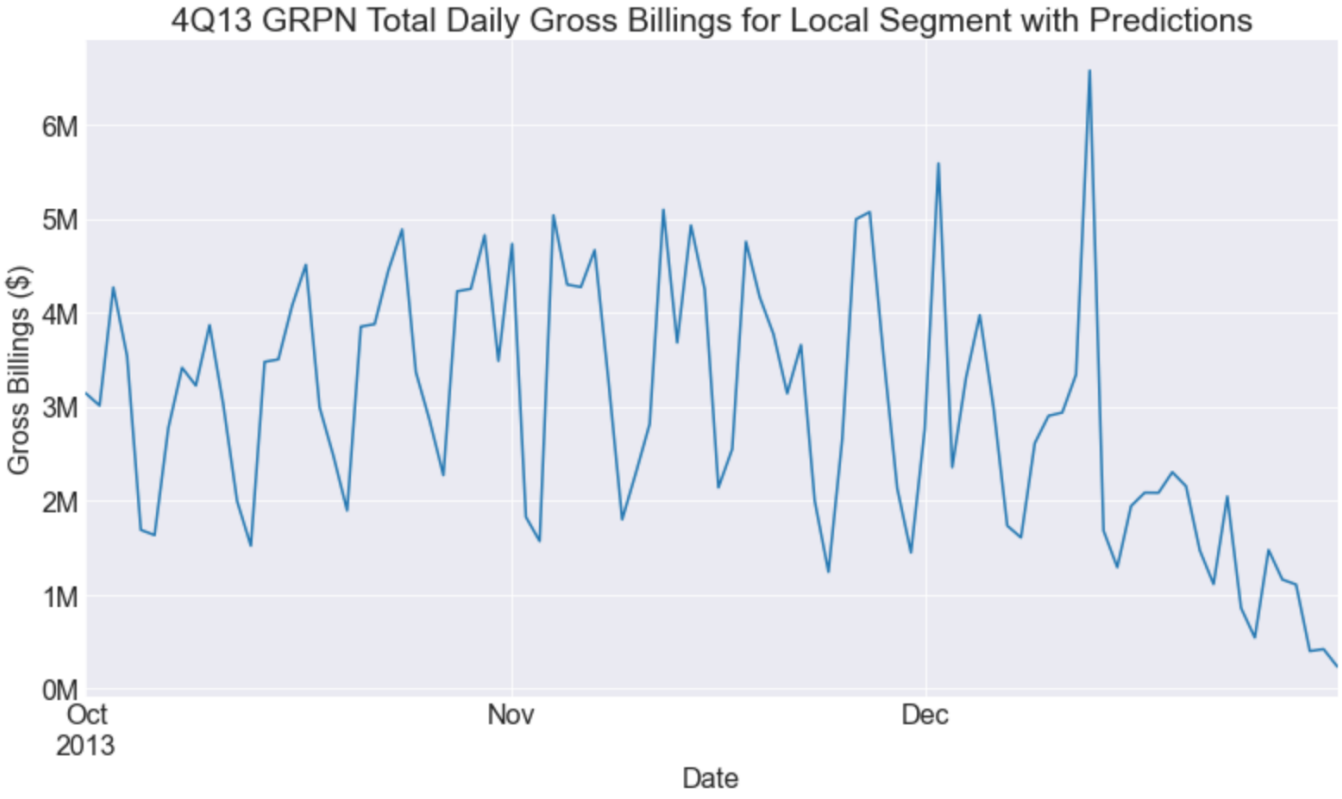
i. Data before 4Q13 is sparse and doesn't appear useful to predict gross billings for 4Q13
ii. There appears to be a drop in gross billings in late Oct of 2013 that I will investigate further below

2. I split the raw data into different tables for each segment (Local, Goods, Travel)

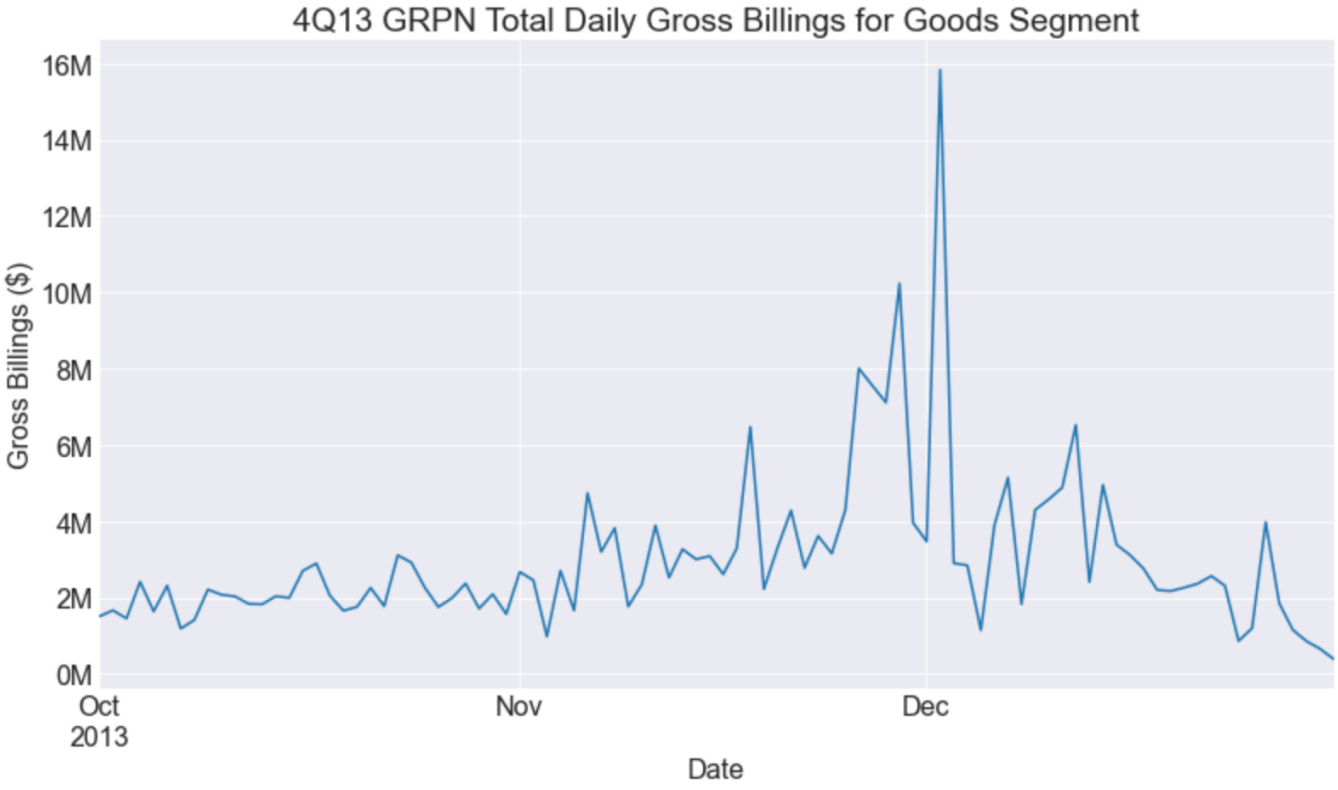


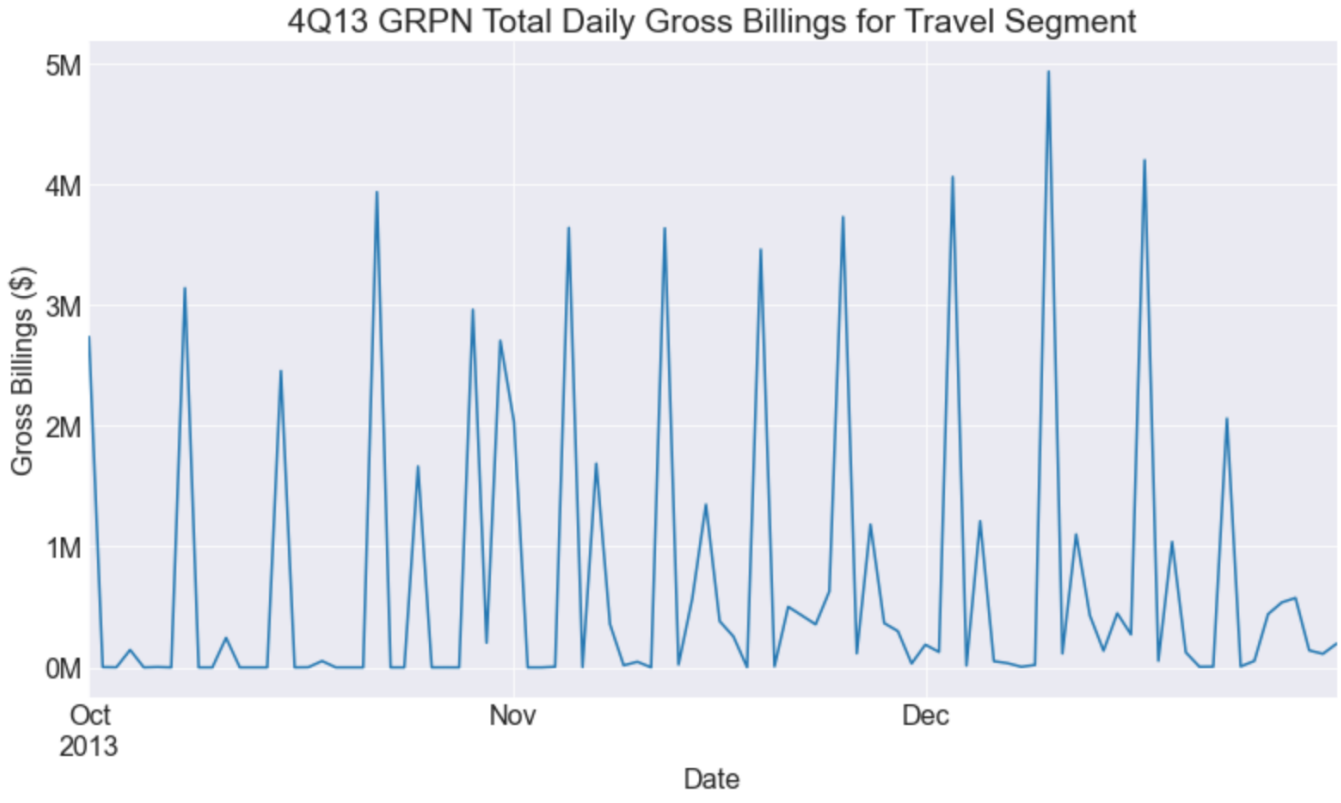
3. I took a look at total sales for each day for the Local segment
    a. Takeaways:
        i. Data before 4Q13 is sparse and doesn't appear useful to predict gross billings for 4Q13
        ii. There is some missing data near the end of Oct for this segment




4. I predicted the missing values using weekly trend noted in data
    a. I first found the average difference between the values for the week immediately preceding the missing values and the week before that week
    b. I took the value for each day a week immediately preceding each missing value and added this average difference to predict values for each missing day
5. I took the sum of all sales in 4Q13 for Local segment using provided data and predictions
    a. $271.1 M




6. I repeated the process above for the Goods segment without any predictions
    a. Takeaways:
        i. There doesn't appear to be any obvious missing data for this segment
7. I took the sum of all sales in 4Q13 for the Goods segment using provided data
    a. $276.3 M



8. I repeated the process above for the Travel segment without any predictions
    a. Takeaways:
        i. There doesn't appear to be any obvious missing data for this segment
9. I took the sum of all sales in 4Q13 for the Travel segment using provided data
    a. $68 M

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| **Total** | **$185.0** | **$241.9** | **$188.5** |
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10. Split this data up into months and found totals

| | Q3 2012 | Q4 2012 | Q1 2013 | Q2 2013 | Q3 2013 | Q4 2013 (Avg) |
|---|---|---|---|---|---|---|
| **Margin (%)** | | | | | | |
| Local | 34.59% | 27.72% | 32.36% | 34.27% | 34.35% | 32.66% |
| Goods | 18.45% | 9.44% | 7.53% | 13.70% | 11.11% | 12.05% |
| Travel | 21.26% | 20.02% | 21.61% | 20.43% | 17.15% | 20.10% |
| **Total** | **29.07%** | **21.08%** | **25.30%** | **27.32%** | **25.80%** | **22.02%** |

11. Calculated the margin for each quarter based on Groupon's historical reported metrics

| My Prediction | Q4 2013 |
|---|---|
| **Profit ($ million)** | |
| Local | $88.5 |
| Goods | $33.3 |
| Travel | $13.7 |
| **Total** | **$135.5** |

12. Used these margins and the gross billings numbers to predict profit for 4Q13
13. Compared these numbers to Sell-Side Consensus 4Q13 Estimates
    a. See commentary on irregularities found below

**Irregularities that I found:**

- Total gross billings for the Local segment was significantly lower than historical reported metrics and sell-side consensus estimates
    - Even after missing data was imputed
    - Based on my analysis and raw data provided, I have confidence in this estimate
        - If this estimate is correct, this would be very useful information for clients and investors since it varies so significantly from the expected numbers

**Notes:**

- Analysis was performed using python, pandas, and matpotlib in a Jupyter Lab environment
    - Full analysis can be provided in .ipynb file, if desired
- An Excel spreadsheet was used to house tables
    - This can also be provided, if desired