

Driver Scheduling Model

(LTL (Less-than-truckload) Shipping Services Company)

Created a model to generate repeatable and predictable itineraries that can be assigned to drivers

Driver Scheduling for Less Than Truck Load (LTL) Company

ABOUT THE CLIENT: Client is a B2B Less than Truck Load (LTL) logistics company providing transportation services across all major metro cities in the U.S.

SITUATION

VALUE ADDITION

IMPACT

- The routes traveled by truck drivers were changing on a frequent basis as the terminal assigns them with the next available dispatch. Client was looking to provide repeatable and predictable schedules to their in-house drivers to ensure good experience and high retention.
- Merilytics partnered with the client to build a route creation and assignment model to assign drivers with repeatable routes based on the monthly demand of the company and the driver preferences.
- Identified the drivers needed per week between each set of terminals based on the demand between terminals and allowed hub-and-spoke routing.
- Created repeatable daily, weekly, fortnightly outand-back (A-B-A) as well as triangular itineraries (A-B-C-A) based on the length and frequency of each trip, following all the driving regulations set by FMCSA (Federal Motor Carrier Safety Administration).
- Mapped the itineraries to the drivers with weightages based on distance from the preferred terminal/region as well as driver tenure and historical routes they have travelled.
- Created 200+ repeatable itineraries from which drives can select from and provided a prioritized list of driver options for each itinerary based on the scores generated by the weightage.

- Itineraries created by the model helped client provide their drivers with repeatable schedule options and thus improved their driver retention rate.
- The predictable schedule helped the client plan for ad-hoc demand efficiently that should be catered by external power and thus reducing peak demand costs incurred for this external power (third parties providing trucks and drivers).

2

INPUTS PROCESSING PROCESSING OUTPUTS

Methodology/ Approach

Itinerary Building – Dispatch creation

Created the dispatch timings of each dispatch based on the demand between legs and the frequency table (Friday, Tuesday, Thursday, Monday, Wednesday)

- If there are 2 dispatches from A-B, they will happen on Friday and Tuesday from A.
- If there are multiple dispatches on the same day (if A-B has > 5 dispatches/week), stagger the dispatches by 2 hrs from the terminal closing time.

Itinerary Building - Triangular route creation

From all the remaining dispatches, identified triangular paths A-B-C-A based on the distance to make the itinerary repeat in 2 weeks.

Followed the same Dispatch Matching methodology, starting with the leg that has least number of dispatches remaining.

Driver Assignment

Calculated the score for each driver and itinerary combination based on the following factors (weightages depend on the client):

Whether driver travelled to those terminals historically

Did the driver select the terminals in his preferences

Tenure of the driver

Created the file to show the preferred drivers for each itinerary based on the score



Calculated the weekly demand between each set of terminals from the monthly demand and the desired route input (eg. desired route for A-B could be A-C-B or A-B or A-D-C-B, depending on the terminals),

Identified the routes that can lead to a daily or weekly or fortnightly out-and-back, based on the trip length.

- A driver can travel a maximum of 3000 mi/week (configurable) and needs a min of 2000 mi/week (configurable) to make a living. Driver drives for 10-11 hrs/day at 50 mi/hr speed.
- A driver needs a 34 hr rest before starting the next trip.

Itinerary Building - Dispatch matching

For each of pairs identified, created itinerary by selecting right match of dispatches from A-B and B-A, starting from terminal with less dispatches. If A-B has 2 dispatches/week (Tue, Fri) and B-A has 5/week (1 each, Mon-Fri), identify corresponding trips for B-A, for each of the 2 A-B trips If the truck dispatched from A on Tuesday reaches B by

- Thursday before noon, pick up Wednesday load from B (i.e., if load needs to wait for <12 hours)
- Thursday post noon, pick up Thursday load from B (i.e., next available load)

Itinerary Building – Validation

Revalidated the itineraries and shortlist the ones that fall under the criteria defined in Selection. Additionally, validated that the trips are strictly within the designated duration i.e., returning to terminal before the end of 24 hrs, 7 days or 14 days accordingly.

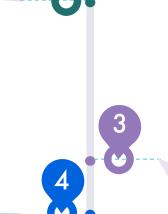




Exhibit #1 – Itineraries Created

ILLUSTRATIVE

| iver can be assigned u | ısing the (| dron do | wn functiona | lity provided in Column * | 'C" for each itinerary | | | | | | | | |
|--------------------------|-------------|---------|----------------|---------------------------|------------------------|--------|-------------|-----------------------|------------------------|--------|-------------|-----------------------|----------------------|
| RIVER ITINERARIES | ising the t | arop do | WII TUIICCIONU | nty provided in column | e for edeli fallerary | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | leg 1 | | | | Leg 2 | | | | Leg 3 | |
| Itinerary number Driv | ver No | Origin | Destination | Departure from Origin | Arrival at Destination | Origin | Destination | Departure from Origin | Arrival at Destination | Origin | Destination | Departure from Origin | Arrival at Destinati |
| 1 | | w L | CHI | Tue 10:00:00 PM | Wed 10:57:29 PM | CHI | ATL | Fri 6:00:00 AM | Sat 6:57:14 AM | ATL | CHI | Mon 6:00:00 AM | Tue 6:57:29 AM |
| 2 10119 | 9 | ^ I | ATL | Tue 3:00:00 AM | Wed 3:57:14 AM | ATL | CHI | Thu 8:00:00 AM | Fri 8:57:29 AM | CHI | ATL | Sat 11:00:00 PM | Sun 11:57:14 PM |
| 3 1013 | 30 | R | ATL | Fri 10:00:00 PM | Sat 3:04:26 AM | ATL | CHR | Mon 6:00:00 AM | Mon 11:02:46 AM | CHR | ATL | Thu 10:00:00 PM | Fri 3:04:26 AM |
| 4 1015 | 53 | N. | ATL | Wed 1:00:00 AM | Wed 10:59:17 AM | ATL | CIN | Fri 5:00:00 AM | Fri 2:57:36 PM | CIN | ATL | Sat 1:00:00 AM | Sat 10:59:17 AM |
| 5 1016 | 67 | L | DLS | Fri 6:00:00 AM | Sat 8:18:58 AM | DLS | ATL | Mon 6:00:00 AM | Tue 8:19:12 AM | | | | |
| 5 1016 1017 6 1019 | 79 93 | ∨ s | ATL | Fri 10:00:00 PM | Sun 12:19:12 AM | ATL | DLS | Mon 6:00:00 AM | Tue 8:18:58 AM | | | | |
| 7 | | DLS | ATL | Wed 3:00:00 AM | Thu 5:19:12 AM | ATL | DLS | Sat 2:00:00 AM | Sun 4:18:58 AM | | | | |
| 8 | | ATL | HOU | Thu 4:00:00 AM | Fri 6:05:53 AM | HOU | ATL | Sat 7:00:00 AM | Sun 9:06:00 AM | | | | |
| 9 | | HOU | ATL | Thu 4:00:00 AM | Fri 6:06:00 AM | ATL | HOU | Sat 7:00:00 AM | Sun 9:05:53 AM | | | | |
| 10 | | IND | ATL | Fri 6:00:00 AM | Sat 3:06:00 AM | ATL | IND | Mon 6:00:00 AM | Tue 3:06:22 AM | IND | ATL | Thu 4:00:00 AM | Fri 1:06:00 AM |
| 11 | | ATL | MIA | Wed 4:00:00 PM | Thu 3:03:36 PM | MIA | ATL | Fri 6:00:00 AM | Sat 5:04:19 AM | ATL | MIA | Mon 6:00:00 AM | Tue 5:03:36 AM |
| 12 | | MIA | ATL | Fri 6:00:00 AM | Sat 5:04:19 AM | ATL | MIA | Mon 6:00:00 AM | Tue 5:03:36 AM | MIA | ATL | Thu 4:00:00 AM | Fri 3:04:19 AM |
| 13 | | ORL | ATL | Fri 6:00:00 AM | Fri 2:43:05 PM | ATL | ORL | Mon 6:00:00 AM | Mon 2:42:36 PM | ORL | ATL | Thu 4:00:00 AM | Thu 12:43:05 PM |
| 14 | | BLT | CHI | Fri 6:00:00 AM | Sat 6:16:05 AM | CHI | BLT | Thu 4:00:00 AM | Fri 4:17:31 AM | | | | |
| 15 | | CHI | BLT | Fri 6:00:00 AM | Sat 6:17:31 AM | BLT | CHI | Mon 6:00:00 AM | Tue 6:16:05 AM | CHI | BLT | Thu 10:00:00 PM | Fri 10:17:31 PM |
| 16 | | CHR | BLT | Fri 5:00:00 AM | Fri 1:34:48 PM | BLT | CHR | Sat 1:00:00 AM | Sat 9:34:41 AM | | | | |
| 17 | | PHI | BOS | Fri 10:00:00 PM | Sat 2:44:53 AM | BOS | PHI | Mon 6:00:00 AM | Mon 10:39:29 AM | PHI | BOS | Thu 4:00:00 AM | Thu 8:44:53 AM |
| 18 | | CHI | CHR | Thu 4:00:00 AM | Fri 5:11:31 AM | CHR | CHI | Sat 7:00:00 AM | Sun 8:11:02 AM | CHI | CHR | Sun 11:00:00 PM | Tue 12:11:31 AM |
| 19 | | CHR | CHI | Wed 3:00:00 AM | Thu 4:11:02 AM | СНІ | CHR | Sat 2:00:00 AM | Sun 3:11:31 AM | CHR | CHI | Tue 3:00:00 AM | Wed 4:11:02 AM |
| 20 | | CHR | CHI | Wed 3:00:00 AM | Thu 4:11:02 AM | СНІ | CHR | Tue 3:00:00 AM | Wed 4:11:31 AM | | | | |
| 21 | | CLV | CHI | Wed 11:00:00 PM | Thu 6:24:50 AM | СНІ | CLV | Sat 10:00:00 PM | Sun 5:25:05 AM | CLV | CHI | Tue 3:00:00 AM | Tue 10:24:50 AM |
| 22 | | DET | CHI | Tue 3:00:00 AM | Tue 8:30:50 AM | СНІ | DET | Tue 10:00:00 PM | Wed 3:31:12 AM | DET | CHI | Thu 8:00:00 AM | Thu 1:30:50 PM |

Exhibit #2 – Driver Matching

This tab lists the compatible drivers for the selected itineraray.

It also provides their availability status based on any previous allocation to other itinerary

TOP AVAILABLE DRIVERS

Itinerary Number 200

| Rank | | Driver No | Driver Name | Compatibility score | Availablity | |
|------|----|-----------|-------------|---------------------|-------------|--|
| | 1 | 11439 | DRIVER 1 | 130 | Available | |
| | 2 | 2253 | DRIVER 2 | 130 | Available | |
| | 3 | 5002 | DRIVER 3 | 118 | Available | |
| | 4 | 11744 | DRIVER 4 | 90 | Available | |
| | 5 | 6751 | DRIVER 5 | 90 | Available | |
| | 6 | 10371 | DRIVER 6 | 50 | Available | |
| | 7 | 10874 | DRIVER 7 | 50 | Available | |
| | 8 | 10966 | DRIVER 8 | 50 | Available | |
| | 9 | 11120 | DRIVER 9 | 50 | Available | |
| | 10 | 11265 | DRIVER 10 | 50 | Available | |
| | 11 | 11416 | DRIVER 11 | 50 | Available | |
| | 12 | 11438 | DRIVER 12 | 50 | Available | |
| | 13 | 11453 | DRIVER 13 | 50 | Available | |
| | 14 | 11469 | DRIVER 14 | 50 | Available | |
| | 15 | 11527 | DRIVER 15 | 50 | Available | |

ILLUSTRATIVE