Shopee Supply Chain

课程
日程表

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        - Vehicle Cost Optimization (API design)
          - Business assumption check(Version 2
          - **Business Assumption for Model**
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          - Clarification Question
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      - 8. SLS: Container Loading (Online)
      - 9. WMS - Warehouse Map
      - 10. OR
      - 11. Grouping Problems
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      - 13.Elastic computing
      - 14.Basic operation unit for logistics
      - 15.Last Mile Hub forecast
      - 16. 3PL Masking
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  - MyStock
  - SLS(Shopee Logistic)
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  - DATA
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  - 内部项目(CICD & APP)
  - SSC Internal Projects
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  - Android Team
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  - 内部分享与培训
  - 废弃文档归总
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  - Finance(logistic finance)
- 线上值班——By Product
- SCFE
- Supply Chain PM Overall
- Driver Assignment

空间管理

Business Assumption for Model

由 hongbo.zhu@shopee.com创建, 最终由 Field-Ye.Tian修改于 2022-12-07 97 views since 13 Oct 2022

1. Business assumption for model design

1. Do not consider driver assignment
2. Classify vehicle types by its parcel capacity
3. Vehicle cost is sum of fix cost +variable cost. fix cost = daily rental fee, variable cost is proportion to distance
   a. currently due to lack of data, variable cost is set to 0;
4. parcel capacity = min(vehicle volume/ average parcel volume, vehicle weight capacity/ average parcel weight)
5. travel time= (distance/ (30km per hour)) * 1.3 (buffer time 30%) + 5min
   a. if travel time < 30 mins, it will be set to 30 min
6. No waiting time for vehicle queue line
7. vehicle must came back within 24 hour
8. accumulated parcels is 0 at time 13:00 pm (the arrive cutoff time is 15:00 pm)
9. **No contraints on rest time (lunch, dinner, rest time) ? ?**

2. Business Constraints

1. vehicle constraint:
   a. vehicle number
   b. parcel capacity
   c. LM hub accepted vehicle type
2. time constraint:
   a. SOC working hour
   b. LM hubs working hour
   c. LM hubs batch cutoff time (including influence of travel time, loading time and unloading time)
   d. total trip hour <=12 hours
3. Instation constraint
   a. Constraint on number of vehicles to departure at same hour is based on the DC map
   b. Storage constraint for Zone 1 in Cakung DC is unlimited (can configure)
   c. Cakung DC dock limitation is unlimited (can configure)

3. Input data (Parameters)

All data are example below, please check this link for real input data: Planning Model Input (verified)

1. LM hubs accepted vehicles (if not available, assume not constraints on accepted vehicles for each LM hub),

Hub name	biggest vehicle type
Pancoran Hub	Type 1
Kola Hub	Type 2

2. SOC+LM hubs working hour 3:00-24:00,

Hub Name	cutoff time
Pancoran Hub	0:00 am -24:00am
Kola Hub	5:00 am-24:00am
Cakung DC	0:00am-24:00

3. total trip hour <=12 hours
4. Maximum milk run station is 2
5. loading time 30 minutes in DC
6. unloading time 30 minutes for each LM hubs
7. 3 batches for last mile delivery. Each batch has cutoff time 6.00am, 12:00am, 15:00pm. Each batch has minimum parcel number to ship out by direct trip
   a. example

Hub Name	cutoff time	Minimum Parcel number to ship out
Pancoran Hub	6:00 am	1000 = (30% * smallest vehicle parcel number)
Pancoran Hub	12:00 am	1000
Pancoran Hub	15:00 pm	500
Kola Hub	5:00 am	1000
Kola Hub	12:00 am	1000
Kola Hub	16:00 pm	500

8. vehicel type:
   a. example

vehicle type	parcel capacity	monthly rental fee	available quantity	fuel fee per Kilometer
CDD	3000	$50	50	$1
CDE	3500	$30	70	$1

4. Decision Variables:

For each route, each hour to decide:

a. departure a trip or not
b. which vehicle for this trip
c. parcel numbers for each destination in this trip

5. Optimization target

Optimize Vehicle Cost including two parts:

1. fix cost: vehicle daily rental cost
2. variable cost: $ by route by Vehicle Type + driver cost per working hour

If only care about vehicle number, set fix cost =1 for all vehicle and variable cost =0

6. Output Format

trip_id	subtrip_number	date	station_name_from	station_name_to	vehicle_id	Vehicle_type	vehicle_parcel_capacity	reference_transport_quantity	load rate	accumulated_parcels	start loading	departure_hour	arriv destina time
1	1	2022-10-01	1	2	V_1	CDD	4500	4500	100.00%		2022-10-01 4:00:00 AM	2022-10-01 4:30:00 AM	2022-1 5:30:0
1	2	2022-10-01	2	1	V_2	CDE	4500	0	0%		2022-10-01 6:00:00 AM	2022-10-01 6:00:00 AM	2022-1 7:00:0
2	1	2022-10-01	1	2	1	CDE	4500	4500	100.00%		2022-10-01 8:00:00 AM	2022-10-01 8:30:00 AM	2022-1 9:30:0
2	2	2022-10-01	2	3	1		4500	2250	50%		2022-10-01 10:00:00 AM	2022-10-01 10:00:00 AM	2022-1 11:00:0
2	3	2022-10-01	3	1	1		4500	0	0%		2022-10-01 11:30:00 PM	2022-10-01 11:30:00 PM	2022-1 00:03:0